Unasylva

Volume IV, Number 1 • January-March 1950

Homes for forest workers

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

NORRIS E. DODD, *Director-General*
SIR HERBERT BROADLEY, K.B.E., *Deputy Director General*

DIVISION OF FORESTRY AND FOREST PRODUCTS

MARCEL LELOUP, *Director*
EGON GLESINGER, *Deputy Director*
R. C. FORTUNESCU, *Executive Officer*

HEADQUARTERS (Washington)

B. CLARKE
N. DE FELSÖVANYI
T. FRANÇOIS
J. D. B. HARRISON
J. KAGAN
C. PURKAYASTHA
H. RECART
T. V. TARKIAINEN
L. J. VERNELL
J. VINZANT

EUROPEAN WORKING GROUP (Geneva)

D. R. CAMERON, *Chief*
F. CZERNIN
R. G. FONTAINE
E. KALKKINEN
P. SARTORIUS

LATIN-AMERICAN WORKING GROUP (Rio de Janeiro)

P. TERVER, *Chief*
H. SCAVENIUS

FAR EASTERN WORKING GROUP (Bangkok)

M. A. HUBERMAN, *Chief*

STANDING ADVISORY COMMITTEE ON FORESTRY AND FOREST PRODUCTS

Chairman: L. F. WATTS
Chief of U. S. Forest Service, Washington, D. C., U. S. A.

Vice-Chairman: B. DUFAY
Hon. Director-General of Waters and Forests, Paris, France

R. R. CASTAÑEDA, *Ministry of Forestry and Agriculture, Bogotá, Colombia*

G. CERF, *Adviser to the Belgian Government on International Timber Affairs, Brussels, Belgium*

COUNT A. CESCHI, *Counsellor, Ministry of Commerce, Vienna, Austria*

H. G. CHAMPION, *Professor of Forestry, Imperial Forestry Institute, Oxford, England*

M. D. CHATURVEDI, *Inspector-General of Forests, Ministry of Agriculture, New Delhi, India*

A. R. ENTRICAN, *Director of Forestry, State Forest Service, Wellington, New Zealand*

A. FJELSTAD, *Delegate of the Royal Norwegian Government for Agricultural Affairs, Washington, D. C., U. S. A.*

S. C. LEE, *Director, Forestry Administration, Formosa*

D. A. MACDONALD, *Director, Forestry Branch, Department of Resources and Development, Ottawa, Canada*

H. MARK, *Director of the Institute of Polymer Research and of the Chemical Department, Brooklyn Polytechnic Institute, New York, U.S.A.*

A. PAVARI, *Director, Forestry Experiment Station, Florence, Italy*

G. J. RODGER, *Director-General, Commonwealth Forestry and Timber Bureau, Melbourne, Australia*

S. A. ROMERO, *Director of Forestry, Ministry of Agriculture, Caracas, Venezuela*

E. SAARI, *Professor, Forestry Department, University of Helsinki, Finland*

P. DE SOUZA, *Chief, Division of Forests and Parks, Ministry of Agriculture and Forestry, Rio de Janeiro, Brazil*

F. TAMESIS, *Director, Bureau of Forestry, Department of Agriculture and Natural Resources, Manila, Philippine Republic*

H. G. WINKELMANN, *Director of the Swiss Forest Economy Association, Solothurn, Switzerland*

TECHNICAL COMMITTEES

Forestry Education: *Chairman,* H. G. CHAMPION, *Professor of Forestry, Oxford University, England*

Wood Chemistry: *Chairman,* H. MARK, *Director of the Institute of Polymer Research and of the Chemical Department, Brooklyn Polytechnic Institute, New York, U.S.A.*

Mechanical Wood Technology: *Chairman,* J. CAMPREDON, *Chief of the National Timber Institute, Paris, France*

Unexploited Forests: *Chairman,* T. GILL, *Secretary of the Charles Lathrop Pack Forestry Foundation, Washington, D. C., U. S. A.*

Forest Research: *Chairman,* E. I. KOTOK, *Assistant Chief in Charge of Research, U. S. Forest Service, Washington, D. C., U. S. A.*

Cable Address: FOODAGRI

Telephone EXecutive 7760

FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

ORGANISATION DES NATIONS UNIES POUR
L'ALIMENTATION ET L'AGRICULTURE

1201 Connecticut Avenue, Northwest
Washington 6, D. C.

Bulletin of New
Publications, No.2

FORESTRY
March, 1950

Plans for UNASYLVA in 1950

Unasylva. FAO's international review of forestry and forest products, has now entered its fourth year of publication. This bulletin outlines editorial plans for the quarterly issues of 1950.

The first issue has already been published, and contains a survey of the work of the United Nations Conference on Utilization of Resources, articles on forest workers' conditions in New Zealand, forestry and forest products research in the United Kingdom, as well as one of the regular series of commodity reports on softwood lumber. News of the world and book reviews have a wide geographical coverage, the former feature including many items relating to the U.S.S.R., selected by a correspondent of international standing from current Soviet journals and publications.

Each further issue will contain commodity reports on important forest products entering into international trade: vol. IV, no. 2 will deal with wood pulp and with pitprops; no. 3 will contain a second report on softwood lumber and a report on fiberboards; no. 4 is scheduled to carry a second report on wood pulp and one on plywood.

The second 1950 issue, apart from commodity reports, will contain an editorial on the vexed question of Quality or Quantity in forest output and supplementary data on world forest resources received since the publication of the initial results of FAO's inventory inquiry. There will also appear in this issue an authoritative description of Forest and Forest Products Research in France. In the following issue an article on Forest Soil Research in Finland will appear.

The third quarterly issue will contain a symposium on forestry aspects of the United Nations technical assistance program for economic development; articles from authorities in various "giving" and "receiving" countries will present their different points of view on the program.

Forestry and Forest Products Research in India will be dealt with in the fourth quarterly issue which will also contain an important article on Advances in Forest Genetics.

A list of Sales Agents for FAO Publications is attached. Payment may be made to sales agents in local currencies.

Bulletin of New
Publications, No.2

FORESTRY
March, 1950

Plans for 1950 in 1950

Unofficially, FAO's international section of forestry and forest products, has now entered its fourth year of publication. This bulletin contains editorial plans for the calendar year of 1950.

The first issue has already been published, and contains a survey of the work of the United Nations Conference on Utilization of Resources, articles on forest wildlife conditions in New England, forestry and forest products research in the United Kingdom, as well as one of the regular series of commodity reviews on softwood lumber. None of the work and book reviews has a wide geographical coverage, the former features including many items relating to the U.S.S.R., selected by a correspondent of international standing from current Soviet journals and publications.

Each further issue will contain commodity reports on important forest products entering into international trade: vol. IV, no. 2 will deal with wood pulp and with plywood; no. 3 will contain a general report on softwood lumber and a report on fibreboard; no. 4 is scheduled to carry a general report on wood pulp and one on plywood.

The second 1950 issue, apart from commodity reports, will contain an editorial on the world situation, of quality or quantity in forest output and supplementary data on world forest resources and since the publication of the initial results of FAO's inventory inquiry. There will also appear in this issue an authoritative description of Forest and Forest Products Research in Pakistan. In the following issue an article on Forest Research in Finland will appear.

The third quarterly issue will contain a symposium on forestry aspects of the United Nations technical assistance programme for economically backward areas; articles on applications in various "living" and "recreation" conditions will present slightly different values of view on the subject.

Forestry and Forest Products Research in India will be dealt with in the fourth quarterly issue which will also contain an important article on Alienation in Forest Operations.

A list of dates fixed for FAO Publications is attached; journal may be made the entire equate in local currencies.

Unasylva

An International Review of Forestry and Forest Products

January-March 1950 Vol. IV, No. 1

CONTENTS

NATURAL RESOURCES 3

FOREST WORKERS IN NEW ZEALAND 7

COMMUNAL PROPERTY SYSTEM 12

RESEARCH IN THE UNITED KINGDOM 14

By F. Y. Henderson, Director of Forest Products Research Laboratory, Princes Risborough, and James Macdonald, Director of Research and Education, Forestry Commission, London

COMMODITY REPORTS

Softwood Lumber 22

THE WORK OF FAO

Fifth Session of the FAO Conference 28

European Forestry and Forest Products Commission 29

Fifth Meeting of the ECE Timber Committee 30

Timber Equipment Loans 31

Forestry Education 32

Yearbook of Forest Products Statistics — 1949 33

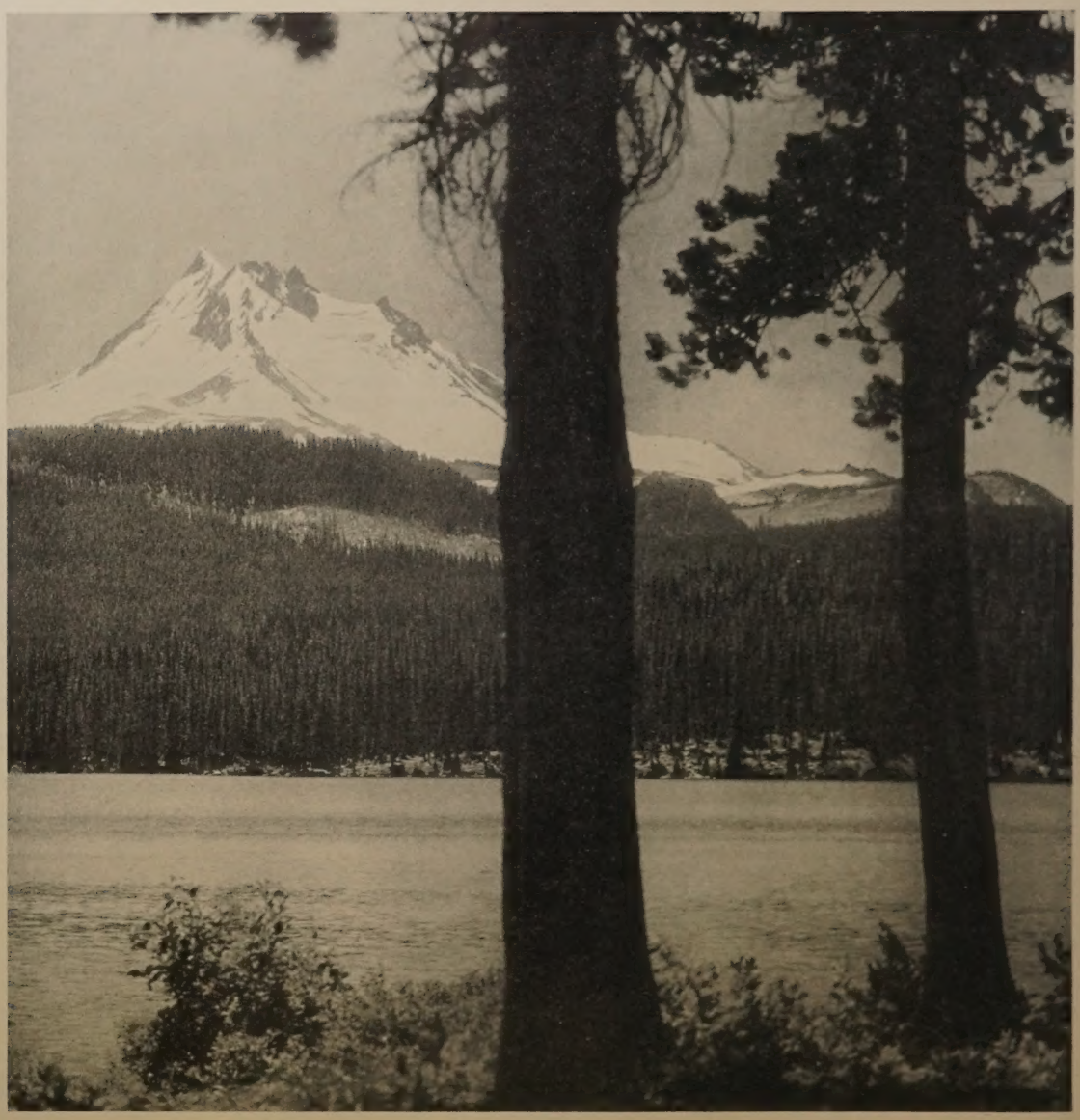
NEWS OF THE WORLD 37

Reviews 42

Cover photograph: Homes for employees of a private timber company in the village of Gilchrist, Oregon, U.S.A. Other views of this model community appear on pages 10 and 11.

—Photograph by courtesy of *The Bend Bulletin*, Bend, Oregon.

UNASYLVA is prepared by the Division of Forestry and Forest Products and published by the Information Division of FAO at the Organization's temporary headquarters in Washington, D. C. It is printed in Baltimore, Maryland, U.S.A. UNASYLVA is published in English, French, and Spanish. In conformity with the established custom of FAO, all units of measurement used in UNASYLVA are given in the author's figures. The metric equivalents are added, where necessary, in parentheses. UNASYLVA may be obtained from the following sales agents: Australia: *H.A. Goddard Pty., Ltd., 255a George St., Sydney;* Canada: *The Ryerson Press, 299 Queen St. W., Toronto 2;* China: *The Commercial Press Ltd., 211 Honan Rd., Shanghai;* Czechoslovakia: *Orbis, Narodni 37, Prague I;* Denmark: *Ejnar Munksgaard, Norregade 6, Copenhagen;* Egypt: *Librairie de la Renaissance d'Egypte, 9 Sh. Adly Pacha, Cairo;* Finland: *Akateeminen Kirjakauppa, 2 Keskuskatu, Helsinki;* Hungary: *Grill's Bookshop, R. Gergely A.G., Dorottya Utca 2, Budapest V;* India: *The Oxford Book & Stationery Co., Scindia House, New Delhi; The Mall, Simla; 17 Park St., Calcutta; Messrs. Higginbothams, Mound Rd., P.B. 311, Madras; Kitab Mahal, Sohrab House, 235 Hornby Road, Bombay;* Ireland: *The Controller, Stationery Office, Dublin;* Israel: *Leo Blumstein, Book and Art Shop, P.O. Box 4154, Tel Aviv;* Italy: address requests to *The European Regional Office of FAO, Villa Borghese, Rome;* Netherlands: *N. V. Martinus Nijhoff, Lange Voorhout 9, The Hague;* New Zealand: *United Nations Association of New Zealand, 13 Grey Street, Wellington, C.1;* Norway: *Johan Grundt Tanum Forlag, Kr. Augustsgt, 7A, Oslo;* Pakistan: (East) *Farcos' Publications, 2 Inglis Road, Post Box 13, Ramna, Dacca;* (West) *Ferozsons, 60 The Mall, Lahore; Variawa Bldg., McLeod Road, Karachi; 35 The Mall, Peshawar;* Thailand: address requests to *FAO Regional Office for Asia and the Far East, Maliwan Mansion, Bangkok;* Union of South Africa: *Central News Agency Ltd., P.O.B. 1033, Johannesburg;* United Kingdom: *H. M. Stationery Office, P.O.B. 569, London, S.E.1;* United States of America: *International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.; FAO Documents Sales Service, 1201 Connecticut Ave., Washington 6, D. C.* Requests from countries where sales agents have not yet been appointed may be sent to: FAO Documents Sales Service, Food and Agriculture Organization of the United Nations, Washington 6, D. C., U.S.A. Annual subscription US$3.50, single copy 65 cents; rates are payable *in local currencies* when orders are placed through local sales agents.



"If the governments of the world would begin to co-operate to develop the resources of the world, that would be the first step towards world unity and world peace."

LORD BOYD ORR, *Nobel Peace Prize 1949*
First Director-General of FAO

Natural Resources

A review of the activities of the United Nations Scientific Conference on the Conservation and Utilization of Resources

IT would be difficult to cite any particular date as marking the beginning of the application of science to the conservation of natural resources. During the ages man has accumulated a vast amount of empirical knowledge regarding conservation of the soil and its fertility, management of forests, control of streamflow, and mining; but at least some of the methods used long ago would today be classed as scientific. Long before the Christian era, highly developed agricultural practices and brilliantly conceived and executed flood-control measures were in existence in China, land surveying was practiced in Egypt, and irrigation had reached a high stage of perfection in the valleys of the Tigris and Euphrates. But, great though the abilities developed in certain lands undoubtedly were, they did not spread easily from region to region; and even in the most advanced countries the amount of attention given to different resources varied widely. For example, China saved much of its best soil, but allowed its forests to suffer destruction.

During the earliest historic times and for many centuries thereafter, many parts of the world were so thinly populated that the effects of man upon his environment were of little significance; but in other regions, where population was denser, misuse of natural resources sometimes led to the downfall of whole civilizations.

During the nineteenth century the development of modern science and its application to practical problems, together with the creation of world-wide communication networks, set the stage for new approaches to the whole question of management and conservation of natural resources. At the same time, the phenomenal increase in population which followed the Industrial Revolution lent new urgency to conservation problems and raised serious questions regarding the quantities of food, clothing, shelter, metals, and fuel which the earth could provide to its children. Far-seeing men began to realize that the resources themselves were not unlimited and that the rapid increase in population would necessitate more careful use of soils and waters and forests and minerals. Above all, reckless and stupid destruction of valuable resources had to be stopped.

During the present century the pressure on resources has continued to mount. Two disastrous world wars have accelerated resource wastage yet have not checked the growth of the world's population. On the other hand, international co-operation for ascertaining facts on a world-wide basis, defining specific problems, and searching for solutions of those problems has developed rapidly during the past fifty years. Natural resources are now finding that place in the consultations of governments to which their importance as the essential bases of life and wealth entitles them.

Today the direct connection between the extent of available resources and the number of people that the world can support with reasonable health and comfort is widely realized. One school of thought believes that continuation of the present rate of population increase for another one hundred years will inevitably lead to overcrowding and to debasement of living standards. Others think that modern science can so greatly increase the productivity of existing resources that no just cause for alarm exists. But both groups agree that the careless and destructive treatment of resources, which still continues on a vast scale, must be halted if disaster is not to overtake the human race.

As the broad problems of resource conservation have been clarified, it has become increasingly evident that plans for conservation, if they are to be effective, must comprise proper management of all resources simultaneously. It no longer suffices to spend great efforts on methods of soil treatment and to neglect the maintenance of ground-water levels, or to build elaborate and costly dams while leaving deforested drainage basins to fill their storage areas with silt. A country which wastefully dissipates its underground resources of minerals eventually will suffer, no matter how scientific its agriculture may be. Furthermore, the time has come when each acre of land, each gallon of water, and each ton of mineral should be devoted to the use for which it is best suited and which will result in the greatest good to the greatest number of people. These ideas provided the principal themes of the United Nations Scientific Conference on the Conservation and Utilization of Resources held at Lake Success between 17 August and 6 September 1949.

The Conference, attended by nearly 600 delegates representing 49 countries and 8 international organizations, was unique in many ways, not least of which was the fact that it adopted no resolutions and made no recommendations to governments. It brought together agriculturists, foresters, mining experts, and

many other kinds of resource specialists from many lands and, through a series of section meetings devoted to individual resources, provided for the interchange of experience between experts and administrators in each special field. This in itself was important; but even more important was the unique opportunity which was provided for specialists to broaden their knowledge and appreciation of the problems arising in fields other than their own. Foresters were able to attend technical meetings devoted to soil conservation; experts in coal mining listened to the discussions of petroleum engineers; agriculturists assisted at meetings devoted principally to the development of hydroelectric power; and livestock experts came in contact with the practical problems of wildlife management and marine fisheries. Furthermore, in the plenary sessions special attention was given to the essential unity of conservation problems and the ways in which the management of one resource may affect the well-being of others.

It has become more and more evident that the uncorrelated efforts undertaken in various fields to preserve natural resources should be viewed as a whole. It is necessary to attempt a global stock-taking at the same time, since obviously the over-all situation can greatly influence any revisions of national policies that may appear advisable. The lasting achievement of this meeting is that it provided just that opportunity. This general stock-taking both from the geographical and from the subject-matter points of view will have far-reaching results. It will take time for the new concepts that must inevitably be the result of this meeting to crystallize in the minds of those who were present and of those who will follow the deliberations through the final printed reports, and be transmuted into practical measures. One of the strongest impressions the meeting gave—both to the specialists who were present and also to the general public which attended in unexpected and flattering numbers—was that something definitely new was emerging and that all conservation activities would sooner or later feel the impact of these discussions.

A new perspective was obtained which will perhaps greatly modify approaches in many fields. Now that the problem has been seen as a whole, pieces of this immense jigsaw puzzle will fit into place more easily, and many questions will have been brought nearer to solution. But, however alluring it may seem to reorganize conservation activities in accordance with a new dominant concept, it should not be overlooked that the existing assignment of natural resources to such government departments as Ministries of Agriculture, Ministries of Mines, and Ministries of Power and Transportation has been arrived at in the light of long experience and important considerations. The same remark applies to the present distribution of international responsibility between the United Nations and the various specialized agencies. It would therefore appear wise to retain this pattern of responsibility and to secure regular co-ordination of work and plans between all agencies concerned with conservation problems rather than to attempt at this time to concentrate all conservation problems in one agency.

Origins and Organization of the Conference

Nearly forty years ago the late Gifford Pinchot, then Chief Forester of the United States, recommended to President Theodore Roosevelt that an international conference on the conservation of natural resources be organized. National and international political developments and other causes delayed the fruition of this idea, yet it was kept alive through the efforts of its originator. On 4 September 1946, only a few weeks before Mr. Pinchot's death at the advanced age of eighty-two, President Truman wrote to the United States representative on the Economic and Social Council of the United Nations, requesting him to propose that the Council sponsor a scientific conference on the conservation and utilization of natural resources. In due course this proposal was considered by the Council, and on 28 March 1947 it was adopted in the following resolution:

> "The Economic and Social Council, recognizing the importance of the world's natural resources, particularly due to the drain of the war on such resources, and their importance to the reconstruction of devastated areas, and recognizing further the need for continuous development and widespread application of the techniques for resource conservation and utilization,
>
> Decides to call a United Nations Scientific Conference on the Conservation and Utilization of Resources for the purpose of exchanging information on techniques in this field, their economic costs and benefits, and their interrelations; such conference to be held not earlier than 1948;
>
> Decides that the Conference be devoted solely to the exchange of ideas and experience on these matters among engineers, resource technicians, economists and other experts in related fields;
>
> Requests the Secretary-General
>
> (a) to undertake the necessary preparatory work related to the scope and organization of the Conference programme and to the consideration of the place and date of the conference;
>
> (b) to consult with the representatives of the specialized agencies having important responsibilities in the fields related to the Conference programme and to consider suggestions which may be submitted to him by Members of the United Nations;
>
> Authorizes the Secretary-General, if he deems it appropriate, to convene a preparatory committee of experts who in his judgment will assist him in carrying out the work described in paragraph 3 (a);
>
> Requests the Secretary-General to keep the Council informed of his activities under this resolution."

Discussions regarding the most appropriate form and organization of the Conference commenced at Lake Success in the following September, and subsequently a temporary advisory committee was set up. This committee included representatives of FAO and other specialized agencies, together with advisers from a number of countries. Its chairman was Dr. Carter Goodrich of Columbia University.

From the beginning it was accepted that the Conference could not, for practical reasons, continue in session for more than three weeks. The program devised, therefore, would have to cover the whole field of natural resources—soils, agriculture, livestock, fisheries, wildlife, waters, forests, minerals, and fuel and

energy—within that short space of time. Because it was desired to bring out the interdependence of many resources and to emphasize the advantages of unified regional planning for their development and protection, it was decided that at least one-half of the time of the Conference should be devoted to plenary meetings, leaving the remainder for the work of specialized sections dealing with individual resources.

As a first step, the United States Government was asked to submit suggestions for a program, and FAO was asked to forward its views with respect to those resources with which it is especially concerned. It proved possible for the appropriate U. S. departments and FAO to work together in Washington and to agree on a preliminary draft. This draft, modified to some extent by the advisory committee at Lake Success, was then sent to governments of all countries for their comments.

At this juncture the temporary advisory committee was replaced by a preparatory committee of experts appointed by the Secretary-General of the United Nations. Dr. Goodrich became its chairman, assisted by representatives of nine countries and of FAO, ILO, and WHO. FAO provided two members of the Committee, Mr. J. D. B. Harrison of the Forestry and Forest Products Division and Dr. Herbert Greene of the Agriculture Division.

In June 1948 the preparatory committee began reviewing the suggestions received from governments, preparing the final program and agenda for the Conference, and selecting authors of papers and chairmen of the various meetings. It was assisted by a small secretariat within the Department of Economic Affairs of the United Nations. Under the direction of Mr. A. J. Van Tassel and in co-operation with the established services of the United Nations at Lake Success, this secretariat prepared invitations, arranged for translation and reproduction of documents, secured accommodations in New York, and provided for transportation to and from the meeting place. Many expressions of appreciation of the smooth working and general efficiency of these arrangements were recorded.

Plans were made for technical discussions to be conducted in six separate sections dealing with land (including agriculture and livestock), water, forests, wildlife and fish, minerals, and fuels and energy. Several sections were to meet concurrently during the mornings, and the afternoons were to be devoted to plenary meetings. The time available for each section was limited to seven or eight mornings, and since no major question could be discussed at great length, a form of procedure had to be devised to ensure maximum progress towards the declared aim of the Conference, namely, the interchange of information and experience. With this object in view, an internationally known authority was invited to prepare a general paper on each subject selected for discussion, and selected countries known to have especially valuable experience on that subject were asked to submit brief accounts of their experience. The intention was to give delegates from other countries an opportunity to ask questions directly of those reporting practical experience. Because time was short, authors were invited to introduce their papers briefly rather than to read them in full. On the whole, this approach gave satisfactory results, although it may be said that in the forestry meetings the number of countries represented was considerably smaller than had been hoped. This may have been due in part to the unavoidable conflict between the dates of the Third World Forestry Congress at Helsinki and the United Nations Conference.

Several field excursions were arranged during the course of the Conference, and a number of forestry delegates took advantage of an opportunity to visit the Charles Lathrop Pack Forest near Warrensburg, New York. There they were able to inspect some interesting stands of white pine (*Pinus strobus*) and to gain firsthand information regarding the management methods applied to an American demonstration forest.

After the Conference ended, arrangements were made by the U. S. authorities for a considerable number of foreign delegates to visit steel mills at Pittsburgh and to take an extended tour through the Tennessee Valley, which, with its great power and navigation developments and the attention given to the conservation of all resources, is probably the most famous demonstration of planned and unified development of a river valley to be found anywhere in the world.

Plenary Sessions

On the morning of Wednesday, 17 August, the delegates were warmly welcomed by Mr. Julius A. Krug, Secretary of the U. S. Department of the Interior, who spoke on behalf of President Truman. Mayor O'Dwyer extended a welcome on behalf of the City of New York, and the Secretary-General of the United Nations, Mr. Trygve Lie, formally opened the proceedings of the Conference.

On the afternoon of the same day the working plenary sessions commenced with a series of important papers, including one on the World Resources Situation by Mr. S. S. Bhatnagar, Secretary for Scientific Research to the Government of India; one on the Legacy of Resource Depletion by Mr. Fairfield Osborn, President of the Conservation Foundation of New York; and one on the Increasing Pressure on Resources by Dr. Colin G. Clark of Australia. The following morning was devoted to a world review of critical shortages, in the course of which the world food situation was discussed by Sir Herbert Broadley, Deputy Director-General of FAO, and a paper dealing with the shortages of forest products, submitted by Mr. Marcel Leloup, Director of the Forestry and Forest Products Division of FAO, was presented by Mr. R. C. Fortunescu. Dr. H. L. Keenleyside, Deputy Minister of the Department of Mines and Resources of Canada, dealt with shortages of minerals, and Mr. John C. Parker, Vice-President of the Consolidated Edison Company of New York, discussed the world situation with respect to fuels and energy.

Space does not permit a review of the whole series of plenary papers, but special mention should be made of the symposium on the last morning of the Conference. Here the highlights arising from the discussions of the various sections were incorporated with the general conclusions of the plenary meetings. In this

symposium Mr. René Jolain, Inspector-General of the Department of Waters and Forests of France, was invited to summarize the forestry findings. He drew particular attention to the close connection between conservation of soils and waters and forests, and recommended that each country try to achieve an effective equilibrium between its forests and agricultural lands. One of the important conclusions to be reached from the Conference was that the tropical forests now constitute the world's principal reserves, and should be treated accordingly. Each country should undertake a thorough inventory of its forest resources in order to provide a basis of definite knowledge for selecting those methods and policies which will enable it to obtain the best yield from its forests and, at the same time, improve their condition. The planting of improved strains of trees should be encouraged. In tropical forests the utilization of additional species of trees should be made the object of concentrated efforts, since this would open up vast new possibilities for rational development.

In all parts of the world forestry should be developed so as to best meet the needs of the wood-using industries; and the industries, in their turn, should learn to make full use of all the products of the forest provided by the silviculturists. Achievement of these goals would entail adequate research programs, and special efforts are needed to find ways and means for reducing the very high wastage of forest output which now exists.

Mr. Jolain emphasized the need for improved protection against forest fires, and his remarks were given heightened significance by the tragic losses of life and of forests which occurred in the United States and in France during the summer of 1949. More adequate protection against injurious insects and tree diseases must also be provided.

The final plenary session, held on the afternoon of Tuesday, 6 September, heard an inspiring address on the Use of Resources for the Enrichment of Human Life by Madame Vijaya Lakshmi Pandit, Ambassador of India to the United States. Following her remarks, Mr. James Thorne of New Zealand, President of the Economic and Social Council, summed up the contribution of the Conference to the continuing work of the United Nations, and especially to the expanded program of Technical Assistance for Economic Development. The Conference was formally closed by the Secretary-General of the United Nations.

Technical Section on Forestry

The Forestry Section held seven meetings. The subjects discussed and the names of the chairmen who presided at the individual meetings are shown hereunder:

19 August—Forest Inventories
Chairman: Dr. P. C. Mahalanobis (India)
Sampling Techniques
Air Surveys

22 August—Protection of Forests
Chairman: Lord Robinson (United Kingdom)
Forest Fire Control
Control of Injurious Insects and Tree Diseases

23 August—Forest Management
Chairman: Mr. R. Jolain (France)
Management and Working Plans and Their Adaptation to Changing Conditions
Selection of Silvicultural Techniques

25 August—Protective Functions of Forests
Chairman: Mr. Reed W. Bailey (United States)
Forests and the Protection of Other Resources
Torrent and Avalanche Control

26 August—Administration of Forests
Chairman: Mr. M. Phillips Price, M.P. (United Kingdom)
Essential Features of Forest Policy and Forest Law
Organization of Forest Services

29 August—Logging and Sawmill Techniques
Chairman: Mr. S. B. Show (FAO)
Improvements in Logging Techniques
Log Transportation

31 August—Preservation and Chemical Utilization of Wood
Chairman: Mr. J. D. Hale (Canada)
Preservation of Wood
Utilization of Wood Waste and Bark

Mr. S. B. Show of FAO presented a paper on 26 August dealing with the organization of forest services, and Mr. Harrison served as Program Officer for six of the seven meetings.

All papers presented to the Conference, together with summaries of the discussions, will eventually be printed by the United Nations. It is not possible to summarize the large number of thoughtful and informative papers which were presented on the subjects of forestry and forest products, but it may be of interest to set down some general impressions.

One notable feature was the unanimity on important questions among foresters from many different parts of the world. Physical conditions within forests, social and economic conditions, and industrial development differ immensely from country to country and from region to region, yet the ultimate objects of all foresters are similar.

In addition to their own section, foresters showed particular interest in meetings dealing with soil conservation, water, and wildlife management, and all present took full advantage of the opportunities to extend their acquaintance among authorities from other countries and specialists in other subjects. From the point of view of the forestry profession, these contacts will have the dual advantage of expanding the outlook of many foresters and securing, on the part of many non-foresters, that increased appreciation of the forester's problems and objectives which always accompanies fuller knowledge.

The members departed from the Conference with the impression that it had been thoroughly worthwhile and with high hopes that it would prove to be an important step towards better international co-operation. This attitude, which was expressed again and again, was the more noteworthy in view of the fact that, at the beginning, many were skeptical regarding the good that could result from a Conference so tremendous in scope and so unusual in organization.

Photo on page 2 by courtesy of the U. S. Forest Service.

Forest Workers in New Zealand

A paper submitted to the Mysore Forestry Conference of 1949 on behalf of the New Zealand Forest Service

THE status of the forest worker in New Zealand has greatly improved within recent years, and conditions of employment are better now than at any time before the war. Broadly speaking, there are two main reasons for this improvement. In the first place, forest work has begun to assume an aspect of greater permanency and now offers more settled conditions; secondly, social improvements, such as better wages, fuller employment, better housing, shorter hours of work, etc., have been introduced since the depression years.

In order to appreciate the impact that has been made on working and living conditions and to visualize the extent to which the future of the forest worker has been made more attractive, it is necessary to understand something of the changes that have taken place in the attitude toward forest utilization since the end of World War I. It is difficult to explain the situation in a few words, but the present forest economy of New Zealand might be described as intermediate between a phase of destructive exploitation of natural forests and a regime in which forest management extends to the bulk of the country's forest assets.

Historically, forest operations followed a rather primitive pattern from the advent of European settlement — a pattern characteristic of well-timbered countries newly opened to settlement. Timber was plentiful, and sawmilling was highly wasteful of forest material. The mills cut for the greatest and quickest return and then moved to a new area.

The shifting nature of sawmilling operations, plus the fact that the mills themselves were crude structures consisting of little more than a roof over the sawing equipment, was reflected in a rather indifferent attitude on the part of the proprietor towards the accommodation needs of his employees. The result was a very poor standard of housing. As there was no future to look to, maintenance was neglected; the cottages, grouped haphazardly about the sawmill, quickly fell into a state of disrepair and were finally abandoned when the area was cut out and milling operations were transferred to another site. As the forest edge receded before the axe and saw, milling operations were forced further and further back, and forest workers labored under the added disadvantage of increasing remoteness from the centers of population and the amenities they offered. Speaking generally, this sums up the environment of the forest worker from the middle of the last century up to the beginning of the period immediately following World War I. The picture is one of destructive exploitation of the forest cover under conditions which offered neither security of employment nor settled living conditions of even a mediocre standard. The circumstances were typical of what was essentially a pioneering period, and little or no improvement was possible so long as the policy of merely following the receding bush line prevailed.

The setting up of the State Forest Service in 1920 and the adoption of a definite forest policy were events which signalled a more positive attitude to forests and forestry that would lead eventually to far-reaching improvements in working and living conditions. The initial objective was the establishment of new forests of rapid-growing exotic species which could be managed for sustained timber production within a relatively short period. These forests could support permanent forest communities with housing and ancillary amenities comparable to modern urban standards. For indigenous forests, this ideal was more remote since their amenability to management on a sustained yield basis was still uncertain. The concept of permanent forest communities was therefore a long-term objective which could only come to full fruition when the exotic forests had taken over from the indigenous forests the task of supplying the bulk of the demand for timber and other forest products; and that would not be before 1960 at the earliest.

When World War II broke out, living conditions at sawmills operating in indigenous forests were generally unsatisfactory and showing little tendency to improve. The industry had been severely affected by the depression and economically was not in a position to improve its accommodation. The exotic forests, for the most part, were approaching a stage when utilization could commence, particularly some of the older State forests; and plans were drawn up for the development of these State forests on the basis of permanent industrial installations and permanent community villages well laid out and complete as far as possible with modern facilities approaching urban standards. The war necessarily restricted the rate of

progress; but a foundation had been laid which denoted a radical departure from the old unplanned, unhygienic, and unattractive order of things so characteristic of forest utilization activities in the past and which promised better things to come when hostilities terminated.

The principal problem which arose when the war ended and man-power controls were relaxed was shortage of labor. This shortage was country-wide and affected all occupations, but particularly the forest industries. The forest labor force was being denuded of personnel by the drift of men to urban centers where living conditions were more attractive and more opportunities were available for the enjoyment of social life and recreation. It was obvious that the only answer to the competition of urban employment was to attract men to forest work by offering accommodation and living conditions that would compare more favorably with average urban standards. This was already the accepted objective; but now there was urgent need for an acceleration of those improvements already accepted as fundamental to the forestry objective. The problem was approached from the following three-fold angle:

(1) Further improvements to accommodation and amenities in the exotic forests.

(2) Village communities for indigenous forests being logged under management.

(3) Prefabricated demountable houses for isolated and short-term sawmilling operations in indigenous forests.

The Exotic Forests

The greater portion of the exotic forests are owned by the State, and the Forest Service now provides for its married personnel a high standard of permanent accommodation comparable to State rental housing. Single men are accommodated either in well appointed one-man timber huts, finished and furnished to a good standard, or in permanent hostels of modern design. There are dining halls for meals, and, where possible, up-to-date sanitary and washing facilities are provided. Modern facilities for the development of community life are provided to equal as far as possible those in urban areas. The larger private forest owners who have recently commenced utilization activities have adopted the same policy and are providing modern housing and means for normal community recreational and social activities. [An example of a similar type of housing development in the United States is pictured on pp. 10-11.] Large-scale industrial developments are pending in both State and private forests, and the employees will be accommodated in permanent forest townships which will be infinitely superior to the primitive forest accommodation of former days.

Indigenous Forests under Management

While permanent forest communities can not yet be set up in indigenous forests, certain areas have recently been opened up which are capable of sustaining a small number of sawmills for a relatively long period of years and which are therefore suitable for the provision of a very much superior type of accommodation to that usually found in indigenous forest operations. In these cases, a community village has been established to house the personnel of all the mills in the particular area. For the main part, the standard of accommodation and amenities is equal to that found in the exotic forest communities; but these villages may not be so permanent. Although a long operating life is assured, sustained yield is not possible unless current experiments with the interplanting of suitable exotic species are successful to the point of giving continuity of cutting after the indigenous timber has been cut out. Many of the dwellings are therefore of the demountable type which can be moved when milling of indigenous timber eventually ceases. Unfortunately, there are not many areas of indigenous forest which are suitable for treatment in this way, but this development represents a vast improvement on the old order.

Other Indigenous Forests

As a result of the total lack of planning in the past, most milling operations are such that planned village communities on modern lines are not practicable; nevertheless, a good deal of improvement has been made since the war. A survey made about four years ago showed that on the whole the standard of accommodation was very inferior, although in some cases millers who had a more progressive outlook and a sufficiently long operating life had modernized existing accommodation and erected new dwellings and single men's accommodation of a very good standard.

The greatest single factor, however, has been the Timber Workers Housing Scheme, which was introduced by legislation in 1946 to provide new dwellings of modern design for timber workers remote from the urban areas and also to improve the general standard of existing sawmill accommodation. In brief, the Government recognized that timber production was vital, but that the very short operating life of most milling units and the unsatisfactory economic condition of the industry precluded the sawmiller from providing a good standard of housing for his employees; yet unless good housing was provided it would be impossible not only to recruit the additional personnel required and bring back men who had left but even to retain those already in the industry. Clearly some form of State assistance was needed, but permanent houses of modern design would be far too wasteful in an industry where the average operating life was under ten years, and in many cases under five. The solution was found in prefabricated demountable houses of five and six rooms transportable in units from site to site as mills cut out and moved on. The scheme was financed by a levy of sixpence per hundred board feet on sawn timber sales, payable by the consumer. These houses, though prefabricated and transportable, have the same standard of modern conveniences as the State rental houses. (By modern conveniences is meant hot and cold running water, electricity for lighting and cooking wherever power is available in the area, built-in cupboards, bathroom and modern sanitary conveniences.) These houses have created something of a sensation in the timber industry and have already led to the return of men who had left for better conditions elsewhere. It is

true that a considerable portion of the industry's housing is still unsatisfactory, but the Timber Workers Housing Scheme has established a standard and is now setting the pace.

Effects of Improved Conditions

Good accommodation, it has been found, is not only the quantitative answer to the forest labor problem, but it is also the answer from the standpoint of quality. The shortage of housing has been so acute for some years now that the offer of a modern dwelling will ensure a position being filled. Competition for good accommodation is so keen that the employer now finds that he has a choice of applicants and can obtain a suitable man or else can afford to wait in the certain knowledge that he soon will obtain one. Previously forest work tended to attract many who were more or less unacceptable in other occupations. Sawmillers have found that the modern prefabricated dwellings supplied to the timber industry not only enable a better type of workman to be recruited but they also enable good men to be retained; this means a greater element of stability in the forest labor force.

This improvement in the standard of accommodation is the greatest over-all social development in the history of forest work in New Zealand. The managed forest is going to be more and more important as a source of timber supplies; and the indigenous forest sawmill hitherto characterized by a limited cutting life, primitive living conditions, and lack of career opportunities will gradually disappear. It will be some time before unsatisfactory housing is entirely a thing of the past; but the pressure of competition from the urban industries is forcing the pace and will help to overcome any inertia which otherwise might threaten to slow down the movement. Forest owners generally now realize that a good standard of housing, plus the provision of amenities normally available to the average urban dweller, are equally as important as good wages in attracting and retaining a contented and efficient labor force.

Conditions have improved in other ways in recent years, especially as regards hours of work and rates of remuneration. In 1936 the 40-hour week was introduced in New Zealand and applied to most industries. The average working week in the sawmilling industry had been 48 hours, but now any time worked in excess of 40 hours is payable at overtime rates, time and one-half for the first four hours and double time thereafter. Wages have also improved considerably over the same period, and there is legal provision for paid holidays embracing two weeks annual leave and the seven statutory holidays each year. All workers are organized, for it is a legal obligation for every workman to belong to an Industrial Union of Employees. Wage rates and other matters affecting the working and living conditions of the forest worker are fixed by collective bargaining under the supervision of the Arbitration Court. In general, most forest workers at the present time are receiving more than the minimum rates; this is a reflection of the good demand for labor arising out of buoyant trade conditions. Injury sustained in the course of duty is compensable in terms of the Workers' Compensation Act, 1922; and, finally, there is a wage premium on work in isolated localities.

As far as the improvement of working and living conditions is concerned, the State has endeavored to set a standard that will attract and hold a superior type of personnel and, incidentally, to point the way to private operators. The Forest Service takes the view that good forest management requires an intelligent, skilled, and stable labor force; it has sought to improve the standard of working and living conditions so that forest work will appeal to men seeking an interesting and congenial occupation. Modern accommodation in well-appointed permanent forest villages and security of employment under conditions that compare favorably with other avenues of outdoor employment are the best guarantees of efficient and contented personnel of the right type.

So much for what has been done, and is being done, to improve the conditions of forest employment. From the viewpoint of forest economics it is necessary to record a debit entry, for the improvement in the standard of working and living conditions has been reflected in greatly increased operating costs. The effect is that the marginal cost level is very much higher than it is in countries which have not been able to develop such an advanced social standard, and much material is left in the forest in New Zealand simply because the cost of extracting it is greater than its market value. Thus social improvements tend to be costly from the point of view of forest utilization, for the marginal product represents material of a much higher quality than the marginal product in countries which follow a more primitive forest economy. Improvements in the standard of living have brought about a position where the higher quality products such as sawlogs, poles, mining timber, etc., have to carry the entire cost of the forest; much material acceptable as fuelwood in other countries must be left on the forest floor because it has a negative value.

Similar comments apply in regard to silvicultural expenditure. Unit costs are so high that the extent of silvicultural work must be limited to the essentials, and much that might be desirable from the viewpoint of good forestry must be curtailed because the cost renders it impracticable.

Photos of the village of Gilchrist which appear on pages 10 and 11 are reproduced by courtesy of *The Bend Bulletin*, Bend, Oregon, from the July 9, 1949, issue.

Above. *The architecture of the shopping center is in modern Norwegian style. The center includes a grocery store and meat market, post office, barber shop, beauty parlor, drug store, and restaurant.*

Right. *These prefabricated houses were erected as an experiment.*

Below. *The movie theater faces the community club.*

Top right. *The church is a hub for much of the group activity in the village.*

Center right. *The dam and fish ladder at the end of the mill pond at Gilchrist.*

Bottom right. *Students from surrounding communities attend classes at the modern grade and high school. The building includes a spacious auditorium used for school and community gatherings.*

THE GILCHRIST MODEL COMMUNITY

The village of Gilchrist in the State of Oregon is home for the employees of a private timber company and their families. With a population of about 500, the village comes close to being a "model" community, with adequate recreation facilities, a shopping center and attractive homes. Construction of the village was begun in 1938, and harvesting of the company's vast timber stands was started in October 1939.

The village lies on both sides of a main highway, with the sawmill and offices on one side and the shopping district, church, service station, school, movie theater, fire hall, and homes on the other. There are about 120 houses, including 13 prefabricated models erected in 1948.

The Communal Forests of Bassins

On the occasion of the second session of the European Forestry and Forest Products Commission, delegates made a field trip to visit the communal forests owned by the small town of Bassins, in the Jura Vaudois region of Switzerland. The delegates were received by the Mayor of Bassins, who spoke on the communal property system, its origin and its influence on the people of the Jura mountains. A translation of his speech, in which he gave many interesting facts about this communal system, peculiar to the Jura Vaudois, appears below.

I SHOULD like to point out in the first place that the communal lands have been gradually increased over the years by successive purchases of separate plots. It was not a question of gifts or appropriations, but of acts of foresight on the part of our ancestors. The original documents in our archives and the records of Council meetings of that period afford striking evidence of the desire on the part of our predecessors to assure the future of their community.

On investigating the matter, we find that communal lands were first established in the seventeenth and eighteenth centuries, but chiefly in the latter, as the result of the break-up of manorial estates, the division of property, and the shrinkage of fortunes. Since the individual inhabitant in our village, as elsewhere, was not rich enough to purchase these frequently large holdings, they were quite naturally acquired by the commune, which thus progressively added to its property. This now embraces 1,063 hectares of forests and 480 hectares of pasture land, making a total area of 1,543 hectares; to this should be added 32 hectares of meadowland, the hay from which is publicly auctioned each year. The road system which had to be built to serve this property comprises a total length of nearly 20 kilometers of paved roads. These are joined by numerous access roads which enable forest products to be hauled entirely by trucks.

The communal property rises from 540 to 1,400 meters above sea level in a series of terraces, intersected by gullies. It stretches from the higher limit of the vineyards to the peaks of the Upper Jura. It is unbroken in its upper reaches, above 850 meters; lower down, wide stretches of forest and meadowland alternate with private estates. Control of this vast domain is vested directly in the Municipality which is responsible for forest management, the sale of products, and the general upkeep of the property, both silvicultural and pastoral. The district inspector of forests is the supervising and controlling authority and the representative of the State. He has picked forest rangers under his direct orders.

The wise foresight of those who patiently built up this magnificent domain over the years has already been mentioned. The possession of this property is closely bound up with the very life of the community whose existence it has directly ensured by providing agricultural and forest products and employment for the inhabitants. The distribution of communal profits is also worth mentioning. This practice of sharing a proportion of the income from the property among the local inhabitants goes back to the very establishment of the property early in the seventeenth century. At first, these distributions, which were also known as "droits," were made in kind. They were taken from the natural produce of the property: timber from the forests, butter and cheese from the pasture land. Fixed quantities of firewood and domestic or industrial timber were distributed annually among those entitled to them. The individual's share varied according to the number of beneficiaries. The Council also allocated the timber required for building and repairs when necessary. It checked the use of such timber and punished abuses. Butter and cheese were supplied by the lessees of the pasture land under the terms of the lease which fixed the quantity to be supplied annually.

The chief reason for these distributions was the need to give material assistance to the inhabitants whose life was hard and whose resources were limited. The practice arose from a need and was the logical consequence of the system. The communal property was acquired by joint effort, and its preservation was vital to the very existence of the communities. It is interesting to note that these "droits" were originally based or granted per "fire," in other words, by household. They could be claimed only by those able to prove that they were responsible for a household. The

intention to help the family and to encourage the setting up of homes was very clear.

This basic principle was subsequently abandoned and eventually the individual and the equality of all, men and women alike, irrespective of family status, became the sole criteria. In the course of the years, profound changes were made in the method of distributing communal profits. Forest and pastoral products earmarked for distribution were publicly auctioned, and the proceeds handed to those entitled to receive them. By the end of the nineteenth century, as public charges increased, the communes one by one gave up the distributions, Bassins being one of the last to do so, in 1933.

This practice is now a thing of the past, of that blissful past before the communes were burdened with present-day charges. Originally, the communal administration provided help for the poor, but it was a less onerous charge than the present system of public assistance. The maintenance of roads and paths was reduced to its simplest form because of the limited extent, not to say inadequacy, of the road system and the simple requirements of the prevailing means of transport. Even communal buildings made very small demands on the budget. Material such as timber, stone, and lime was generally obtained locally and both labor and material were cheap. Administrative expenses were almost negligible, since public works in those times were more a matter of civic conscience and obligation than of self-interest.

Changed customs and the demands of modern life and civilization have profoundly transformed human relations. But, for us, one thing remains unchanged, namely, our age-old experience of collective living where each contributes freely and willingly to the management and preservation of communal property. From that property a man derives the necessities of life for himself and his family, and he benefits from the allocation of the entire income from the property to public requirements. It should also be noted that each man's individuality is fully respected and that no constraint is put on the individual beyond the obligation to observe those laws and regulations which govern relations between man and man and safeguard the rights of all.

Let us now look more closely at the influence of the forest on the local population. Its social role, like its function as a regulating force where employment is concerned, is undeniable. Most of the inhabitants of our villages are engaged in agriculture, usually on small farms which often fail to provide a living. The forest offers them an opportunity to supplement their income, particularly in the slack season and between periods of intensive agricultural work. The workers trim timber on behalf of the commune, which delivers it to the trade directly or through the "Association Forestière Vaudois" with which it is affiliated. The commune also sells, by public auction, lots of firewood and domestic timber to the inhabitants who use it for their own purposes or resell it.

The pasture land and meadow land, which lie within the forested area, supply summer pasture for cattle and additional winter fodder, and thus enable the farmers, and particularly the small farmers, to make good the deficiencies of their own farms and to feed more cattle. In addition, the commune provides a local syndicate with pasture for young cattle.

The forest is essential to man since it enables him to live in regions whose climate it tempers. It not only supplies him with the wood he needs for his fire, and for the building of his dwelling, but it shapes his character, which is strengthened by the living forces that it nurtures. It draws him as the sea draws the sailor. It protects him and sometimes it kills him. If it disappears, he disappears too. He should therefore seek to preserve it, create it, develop it for the sake of the survival of his race.

I have sought in these few words to explain our system of collective property and management to you. This experiment is already several centuries old. It will outlive us. It has kept successive generations in the country and in the villages by giving them an obvious reason for remaining there. This heritage was handed down to us by those who were wise enough to found it. We are merely the trustees responsible for passing it on intact, in our turn, to those who come after us.

Gentlemen, your responsibility is infinitely greater than ours. Your mission is to co-ordinate the efforts of diverse peoples of different races and customs. If you can find some inspiration in the experience of a small commune, something useful for the promotion of harmony among men, we shall be proud and happy. I conclude with these words, and hope that you will have a very pleasant memory of your short stay at Bassins.

Flags on this map show State forests in England, Scotland, and Wales.

Research in the United Kingdom

IN Great Britain, research in forestry and forest products has been actively pursued during the last thirty years, but it is not carried on under unified control as in some other countries. Here, research into problems of forestry is the responsibility, under the Forestry Acts, of the Forestry Commission, while research into the utilization of forest products is one of the numerous subjects dealt with by the Department of Scientific and Industrial Research. Since these two clearly-related fields of research are separately administered and since they have innumerable points of contact, a close liaison between the departments is necessary. This is, in fact, maintained.

Research in Forestry: Organization

The Forestry Commission, as the government department responsible for the promotion of research in forestry, proceeds in two ways: first, by maintaining a research organization to deal with the numerous practical problems which are always arising and, secondly, by giving grants to universities and other institutions with which to conduct investigations of a more fundamental character. The administration of forest research is in the hands of the Director of Research and Education, stationed in London, who is responsible to the Director-General of Forestry; the staff consists of a Chief Research Officer (ranking as Conservator) and 12 research officers, most of whom have a number of foresters and foremen to assist them.

The Chief Research Officer, who has control of all the experimental work carried out by the Commission in Great Britain, is stationed at the new Research Station at Alice Holt, near Farnham in Surrey, and all the research officers, except four who work from Edinburgh, are stationed there as well. A useful account of the development of the Commission's Research Branch can be found in their *Report on Post-War Forest Policy*, published in 1943.

The work is divided into the following sections — Silviculture, Mensuration, Entomology, Pathology, Ecology, and Genetics, each of which, with the exception of silviculture, is headed by an officer responsible directly to the Chief Research Officer. In silviculture, it has been necessary to divide the country on a geographical basis and make one officer responsible for the work in the southern half of Great Britain and one (working from Edinburgh) responsible for Scotland and the north of England. This division accords reasonably well with the distribution of the types of problems which have to be faced in afforestation.

A survey of research in forestry and forest products in the United Kingdom, written for UNASYLVA

By

F. Y. HENDERSON, Director of Forest Products Research Laboratory, Princes Risborough,

AND

JAMES MACDONALD, Director of Research and Education, Forestry Commission, London

Afforestation of hillside. Experimental plantation in a State forest in Wales.

ACTIVITIES OF RESEARCH BRANCH OF FORESTRY COMMISSION

Silviculture

In the field of silviculture, circumstances have dictated the lines which have been followed, and the early concentration of effort by the Commission on the establishment of plantations on bare land caused the silviculturists to concern themselves mainly with problems arising out of afforestation. More recently, other problems have arisen as the plantations have developed, and it is likely, as time goes on, that the proportion of effort spent on purely afforestation problems will diminish further.

The establishment of plantations, which has formed the major part of the work in the last thirty years, has consisted in the main of dealing with problems associated with particular types of land, with peats, with upland *Calluna* soils, with lowland heaths, with clay soils, and with chalk downland. In each case, there has been experimental work on choice of species, on methods of soil preparation, on methods of planting, and, on the first three types at least, on manuring. In addition, work has been carried out on age and type of plant, on planting distances, and on mixtures and nurse species. Not unnaturally, most of the work has been concerned with the establishment of conifers but a considerable program of investigation has been undertaken in connection with the establishment of broadleaved species. Some of this work has been carried out on land which was not carrying or had not carried forest, but the bulk of it was developed on old woodland sites. The species principally concerned were oak, beech, ash, and sycamore, although minor trials of walnuts, both *Juglans regia* and *Juglans nigra*, have been attempted. Particular attention was paid to spacing, to the use of conifers as nurses, to the arrangement of species in mixture and to studies of the effects of weeding.

Along with these investigations into the establishment of broadleaved trees on old woodland sites, there were occasionally combined attempts at finding cheap and convenient methods of restocking these sites. Many of the old broadleaved woodland areas, largely as a result of war-time devastation and felling, are in a deplorable condition, and the acreage of derelict and devastated woodlands of this character amounts, in the aggregate, to a substantial figure. The need to regenerate them speedily is urgent and, accordingly, this project has now assumed much prominence in the program of future research work.

Experimental work with poplars, with which the pathologist has been closely associated, has been directed mainly to securing a rapid-growing and canker-

resistant variety. After considerable experience under British conditions the following four poplars have been selected as the most promising in the present state of our knowledge — *Populus nigra*, *Populus serotina* var. *erecta*, *Populus robusta*, and *Populus gelrica*. Work with this important genus will continue and the geneticist, as well as the pathologist, will be associated with its development.

Since most of the new and restocked forest areas in Great Britain are formed by planting, the raising of the necessary stocks in nurseries is an essential link in the chain of operations, and the investigations into different aspects of nursery practice have involved a large program of research and experimental work covering the whole field of practice in the nursery. This work has resulted in numerous improvements in practice.

More recently, attention has been paid, in particular, to two main points — the maintenance of fertility in established nurseries and the attempt to cheapen costs of establishment by raising suitable planting stock in a shorter time. With regard to the latter, considerable progress has been made in raising large one-year seedlings of numerous species by the use of composts and artificial manures and by the development of heathland nurseries. The maintenance of fertility in established nurseries, which raises deep-seated problems of nutrition, is being studied at the present time, not only by the Commission's own staff but by well-known soil scientists.

In all the experimental work, both in the forest and in the nursery, particular attention has been paid to methods of layout and to experimental design and technique in general.

Students carrying out high pruning in an experimental plot.

Research and experimental work in silviculture engages the attention of six officers, three are stationed at Alice Holt and three at Edinburgh.

Mensuration

Organized collection of data on the growth and production of the different forest trees is a comparatively new thing in the United Kingdom. Nothing of this sort was attempted until shortly before the war of 1914-1918, a curious circumstance in view of the widespread and long-continued interest in the cultivation of a large number of species. The abnormally heavy fellings, which were made during that war, gave an exceptionally good opportunity for collecting data on a large scale all over the country, an opportunity which was seized by the Forest Authority of that time. More than 1,100 sample plots of many species, almost entirely coniferous, were then measured in all parts of the country and, based on information obtained from them, a set of Yield Tables for the principal conifers was published shortly after the end of the first war. Those tables were the best that could be produced in the circumstances, but they had their limitations. The data for the principal species, Scots pine (*Pinus sylvestris*), European larch (*Larix decidua*), and Norway spruce (*Picea abies*), were not inadequate, but they were obtained from crops managed on a system which, even then, was obsolescent, a system characterized by close spacing at planting and light thinnings thereafter. Newer exotics, like Sitka spruce (*Picea sitchensis*), Japanese larch (*Larix leptolepis*), and Corsican pine (***Pinus nigra*** var. ***calabrica***), on which the postwar afforestation so largely depended, were so poorly represented that only short provisional tables could be prepared.

In order to obtain more accurate data which could be used to improve and extend the first Yield Tables, permanent sample plots were established at an early stage, and work on these plots still continues. As has already been mentioned, these permanent plots also have a strictly silvicultural aspect in the comparative trials of thinning grades which are carried out when sets of plots are established, and they are now yielding valuable information on the production of various species under different grades of thinning. In 1928, a first revision of the Yield Tables was made possible by the accumulation of data from the permanent plots, and new tables are now in course of preparation for a number of species. The first of these, for Japanese larch, will be published shortly.

Many permanent sample plots have been established, but losses due to felling, wind, and other causes have reduced their number. At the present time, there are 387 effective plots in existence. These cover a wide range of sites, except, possibly, the poorest, because the slow-growing plantations have usually not yet reached the stage when plots can be established. The principal coniferous species are reasonably well represented while, among the rarer species, plots have been formed in ***Pinus monticola*** and ***Picea omorika***.

Although a small number of permanent plots has been established in plantations of broadleaved species, very little is known of the growth and production even of common trees like oak, beech, ash, birch, and

sycamore. The reason is that, outside the State plantations, there are very few stands suitable for careful investigations of this kind. Most of the privately owned broadleaved forest is old; its silvicultural history is unrecorded; it is, in general, seriously understocked. In the State forests, some of which contain considerable areas of old broadleaved woodland, most of the young plantations are not yet ready for sample plot studies.

The increment of broadleaved trees is being investigated by means of an examination of large numbers of felled trees in various parts of the country and, although this method possesses certain disadvantages, it is the best which can be adopted in the circumstances. Volume tables, for broadleaved and for coniferous species, are also in course of preparation.

A method of volume sampling on a country-wide basis, for use in connection with the Census of Woodlands, has been worked out, and investigations are proceeding into the yield in thinnings from young conifer plantations.

The heavy fellings which were necessary during the Second World War gave another opportunity of collecting data which could not have been gathered in the normal way. This work was carried out partly by members of the university staffs, financed by a grant from the Commissioners, and partly by an officer specially appointed for this purpose. The main object of this investigation was to correlate rate of growth with the different locality factors. The results are now being worked up for publication.

The officer in charge of the work on growth studies and mensuration is stationed at Alice Holt; he is assisted by another officer who is quartered in Edinburgh.

Ecology

The appointment of an officer to conduct ecological investigations from Alice Holt was one of the first measures taken in the recent postwar reorganization of forest research, and it was regarded as a step towards a fuller examination of the whole complex that constitutes a forest. As an initial task, the ecologist was given the beech to study. This tree, which has been planted in all parts of Great Britain and is a characteristic feature of certain districts, such as the chalk hills of the Chilterns and South Downs, raises some difficult silvicultural problems on which, it is felt, much light will be thrown by a proper understanding of the ecological factors.

There is one other aspect of ecological work which may be referred to. In 1938, at a meeting of the British Association, in Cambridge, the Chairman of the Forestry Commission announced that the Commission would be prepared to set aside certain unplanted areas in their forests for the study of ecological changes and succession by experts from the various schools of botany. This offer was quickly accepted. The work was seriously interrupted by the war, but it has now recommenced, and valuable records have been prepared for eight different areas.

Genetics

The study of the genetics of forest trees, which has made remarkable progress in recent years in many countries, has now been added to the list of projects which is being undertaken by the Research Branch. An officer has recently been appointed for this purpose and a section is being equipped at Alice Holt for his investigations.

Pine seedlings coming through granite chippings, laid on seed beds to prevent a crust forming on the ground.

A wide field of activity is available but up to the present time the officer in charge has been engaged in preliminary work and in making an assessment of the more immediate problems.

Pathology

Generally speaking, although there is a steady loss each year from tree diseases caused by fungi, there has been an absence of attacks of great severity attributable wholly to this cause. Nevertheless there is need for constant watchfulness.

Two of the most serious diseases affect species which are not mainly forest trees; these are the elm disease (*Ceratostomella*), widespread in the southern parts of Great Britain, which has been under close observation for about twenty years, and the bacterial watermark disease of the cricket-bat willow (*Salix alba* var. *caerulea*), which is very serious locally.

The chestnut, an important crop in parts of southern England, is being kept under close observation owing to the appearance in Europe of the chestnut blight (*Endothia*). Although this disease has not occurred in England, its presence on the Continent is a matter of some concern.

In the coniferous plantations, numerous cases of damage by various fungi come up yearly for investigation and report, and much of the pathologist's time is taken up with studies of this kind. A further set of problems for the pathologist arises from instances where a fungal or bacterial agent is absent or is obviously of secondary importance and where other causes must be sought. One example of this is frost damage which is often a serious matter in Great Britain; another is drought, which in certain seasons may cause appreciable damage.

Entomology

Like pathology, entomology in Great Britain has not had to deal in recent years with widespread attacks. About forty years ago, however, there was very serious damage to European larch plantations in the west and northwest of England, the result of a widely distributed infestation of the large larch sawfly (*Pristiphora*). It is possible that the peculiar climatic conditions in this country may not be generally favorable to the development of severe insect infestations; but, on the other hand, the large areas of coniferous plantations in all parts of the country, many of them of exotic species, provide a possibility for such developments if other conditions permit. The main duty of the entomologist at the present stage, is to study the insect populations in the plantations by means of regular surveys, paying attention to the status of potential pests and their parasites and predators, and to estimate the probability of outbreaks on a serious scale.

Among the insects which are being studied are the following: the bark beetles, aphids, particularly the *Neomyzaphis* on Sitka spruce, chafers which from time to time cause serious damage in the nursery, and sawflies on various conifers.

Mechanization

During recent years, forestry in Great Britain has become more and more mechanized, the result, partly, of the general development of mechanical equipment, but, in the main, the consequence of the rising cost of labor and the need for timely completion of large annual programs. Much of the work preparatory to planting has now been mechanized, as well as many operations in the nursery, while increasing production from the young State forests, in the form of thinnings, has raised problems in extraction and in transport which are likely to be solved only by the increased use of machines. It is rarely found that machines, designed for other purposes, can be used in the forest without some modification, and many questions crop up from time to time, to which there is no suitable mechanical answer. Accordingly, a development engineer has been appointed, to study mechanical developments in their relation to the practice of forestry, to examine selected types of operation with a view to mechanization, and to initiate any progress in this direction. This office is stationed at the Commission's headquarters in London and not at Alice Holt.

Grant-aided Research: Soils

Grants for the promotion of research into forest soils have been made to various institutions over a considerable period of years. From 1921 until 1935 studies of the peat soils of the west and northwest of Scotland were made at the University of Aberdeen; in 1935, the scope of this work was enlarged by grants to the Macaulay Institute of Soil Research at Aberdeen which carried out valuable surveys.

Within recent years, grants have been made to the University of Oxford, to the Macaulay Institute, and to Rothamstead for fundamental research in forest soils. Both the Macaulay Institute and Rothamstead have been involved in the research on nursery nutrition which is now going on.

Important researches, which have had a profound effect on nursery practice, were carried out by Dr. M. C. Rayner, the expert on mycorrhiza, from 1933 until her death in 1948. These investigations were assisted by grants from the Forestry Commission.

Advisory Committee on Forest Research

This Committee, first appointed in 1930, advises the Commissioners on the different aspects of their research work. Composed of leading authorities on silviculture, botany, pathology, entomology, soils, and forest products, it meets annually and carries out inspections of field experiments. The detailed work which is proceeding on the nutrition of plants in the nursery is supervised by a subcommittee under the chairmanship of Professor F. T. Brooks, F.R.S.

Forest Products Research

In Great Britain research into the utilization of forest products, as distinct from problems of forestry, is carried on at the Forest Products Research Laboratory, Princes Risborough, Bucks. The Laboratory, which is an establishment of the Department of Scientific and Industrial Research, maintains close cooperation with both the Forestry Commission and the timber-using industries of the country and has a working arrangement with the Imperial Institute, London, which deals with minor forest products and certain aspects of pulping. The Laboratory also works in conjunction with the Timber Control and Raw Materials Departments of the Board of Trade and with other government departments and public bodies concerned in timber utilization, and it is represented on the appropriate committees of the British Standards Institution and those dealing with Codes of Practice.

Standing as it does between the producing and consuming sides of the timber industry, the Laboratory may be said, broadly speaking, to be concerned with all the technological aspects of the timber of a tree from the time of its felling to the point at which it is incorporated in a manufactured product. The general fundamental research work into the properties of timber thus underlies a technological organization whose orientation is predominantly towards close utilization and conservation of supplies and, since the war, provision of substitutes for such traditional or specialized timbers as are in short supply or not available. The separation of forestry research and forest products research in the United Kingdom reflects this country's position as one with a heavy demand for imports — for while the Forestry Commission research organization is mainly concerned with problems involved in the growing of the home-grown crop, the Forest Products Research Laboratory has to do with the utilization not only of home-grown timber but also of the large number of species which must be imported. In the timber-producing countries this preoccupation with the properties of overseas species is not of prime importance. In the United Kingdom it is very important. Another factor also important in determining the orientation of the research in timber is the

Abrasion machines for the testing of floors.

lack of research associations within the user industries themselves, whose fields of activity are extraordinarily diverse. The result of this is seen in the enormous mass of industrial advisory work with which the Laboratory is called upon to deal.

The organization of the Laboratory is on the basis of two groups of specialist sections each under a coordinating officer — the biological and the engineering groups — together with the sections of Wood Chemistry, Physics, and External Relations. The sections, each comprising a team of workers in charge of a specialist, deal with research and advisory work in their own sphere. Each has its own contacts with industry, other government departments, and scientific colleagues in the United Kingdom and overseas; each carries on its own specialist advisory service and provides representatives for the various technical committees.

The general program of research includes those long-term investigations normal to all the Forest Products Laboratories, but, in addition, postwar conditions have brought a great increase in those projects concerned with the closer and more efficient utilization of wood in industry and in building and with the investigation of the properties and potentialities of many timbers new to the British market. Thus among the chief preoccupations of the Laboratory at the present time is the testing and evaluation of those colonial species likely to be useful in forwarding the optimum exploitation of the colonial forests for local and export markets.

The specialist sections of the Laboratory referred to are as follows:

Wood Structure. This section deals with all questions involving anatomy and identification. It maintains the standard collection of timbers and carries out fundamental research in comparative anatomy and cellular structure. It advises on questions of uses and substitution and deals with those problems arising from the work of other sections which directly involve considerations of structure.

Seasoning and Wood Bending. Besides the technical work on kiln design and the provision of operating schedules for the seasoning of different timbers, this section deals with unorthodox methods of seasoning — e.g., radio-frequency and chemical drying — and with all problems involving moisture-content and the effects of its variations upon the size, shape, and properties of timbers used for different purposes. It has a wide advisory service to industry and carries on courses of instruction for the training of kiln operators. The Subsection of Wood Bending carries out experimental work on all aspects of solid and laminated bending and provides detailed practical information on method and on the relative suitability of different species for particular industrial uses.

The wood structure laboratory, Princes Risborough.

Timber Mechanics. This section has to do with every aspect of the strength properties of timber, from the provision of basic data on small clear specimens to the testing of full-scale structures. This calls for investigations into the influence of defects upon the grading of large sizes, the properties and comparison of the various types of joints, and, at the present time, the problems introduced in the designing of "economy" structures.

Wood Preservation. The preservation of timber from attack by fungi or by insects involves questions of the natural durability and resistance and of the theory and practice of immunization. Laboratory tests on infestation by specific insects and fungi are carried out in the Sections of Entomology and Mycology respectively. The work on durability in the field, and on commercial-scale processes of impregnation of timber with creosote and other protective solutions, including both the chemical and the engineering aspects, are dealt with by the Section of Wood Preservation, which also carries out research, both fundamental and applied, into the properties and uses of fire retardants. Among the projects of this section are the processing of railway sleepers, telegraph and transmission poles, pitprops, and marine timbers, as well as the maintenance of "graveyard" field tests on durability in different parts of the country.

Woodworking. Much research into the principles underlying the cutting of wood in the various woodworking machines is still required. This work, together with that of assessing the machining properties of different species for various uses, is the business of the Section of Woodworking. The advent of new and sometimes refractory timbers and of composite materials having wood as a major component has given rise to new problems for research into the materials and design of cutting edges. The relation of abrasion to structure and density is important in flooring work, and laboratory and full-scale tests provide data for the assessment of floors of maximum efficiency under different kinds of traffic. Problems concerning the disposal of sawdust and the design of charcoal kilns are also included in the program of the woodworking section.

Composite Wood. The whole range of laminated and bonded products forms the basis of the work of this section. Plywood in all its forms is the chief subject, and its problems include those of manufacture, yield, suitability of species, and durability. Research in hand also includes investigations upon larger built-up members such as laminated beams, and upon tropical testing, radio frequency heating, and "improved" woods of various types.

Mycology. This section maintains the national collection of wood-destroying fungi and carries on fundamental work as well as laboratory tests upon resistance to decay and upon the efficacy of preservatives. As timber technologists, its staff are concerned not only with those fungi which destroy wood after conversion but also with those of the standing and newly-felled tree which are likely to affect the utilizable timber. Much of the section's time is devoted to investigations in the field, particularly to outbreaks of dry rot in buildings.

Entomology. The laboratory work includes research upon the life history and physiology of wood-destroying insects, and upon the efficacy of the various insecticides used in combating pests of buildings, furniture, etc. As with the Mycologists, the work involves investigations into pests of standing or newly-felled trees—e.g., pinhole borers—both at home and in dependent territories.

Wood Chemistry. The functions of the Section of Wood Chemistry, in addition to its advisory work both within the Laboratory and outside, are twofold: research into the fundamental constitution of wood, and applied work on specific timbers, particularly colonial timbers, as sources of utilizable breakdown products.

Physics. The strength, seasoning, and behavior of timber in working are intimately related to its physical properties. The Section of Physics, like that of Chemistry, provides a background of pure science for the work of the applied sections on such aspects as wood-water relations, the diffusion of heat and gases, and the elastic properties of timber.

External Relations. This section takes charge of the wider liaison, as distinct from sectional and individual contacts, between the Laboratory and outside bodies. As it is considered desirable that all senior officers should have a personal interest in research, the head of the Section of External Relations is normally an experienced forester with scientific qualifications who is responsible for carrying on the research and advisory work relating to forestry subjects, and particularly for co-operative work with the Forestry Commission on problems such as the effect of pruning, rate of growth, etc., upon the quality of the timber. The general arrangement of this work rests with the Director-General of the Forestry Commission and the Director of Forest Products Research, who serve upon each other's advisory bodies. On the technological side, the section collates the general research data of the Laboratory, carries out industrial studies into the better utilization of wood and the introduction of new species, and also investigates problems connected with traditional timbers now in short supply.

Its routine work includes the arrangements for dealing with visitors and with general matters of publicity, including the staging of exhibitions.

Publications and Records. The publication of books, bulletins, and leaflets covering the Laboratory's work and of articles in scientific journals is undertaken by this section, which also provides all the usual library facilities required by the establishment.

• • •

The organization of the Laboratory as separate specialist sections under general administrative control, rather than in larger groupings, provides a flexible disposition of resources suited both for ease of internal working and external contact. Specific enquiries are dealt with by the specialists themselves, and not through any intermediary body. This ensures a service of the best advice, quickly rendered to the enquirer, and also keeps heads of sections fully aware of scientific and industrial trends. This mode of organization also enables comparative research projects to be easily arranged and carried out by relevant groups of sections. Thus a project, say, on the effect of toxic substances incorporated in the glue used in plywood upon infestation by wood-borers would involve an ad hoc co-ordination of the sections of Entomology, Composite Wood, and Wood Preservation with the assistance of Chemistry and Wood Structure, or any other section as need may arise.

In addition to the scientific sections are the ancillary services, administrative and technical, required for the general work of the Laboratory. The whole establishment is under the administration of the Director, together with the Assistant Director and Co-ordinating Officers previously mentioned. The Director is responsible to the Secretary of the Department and thus to its Advisory Council.

Photographs on pages 14, 15, 16, and 17 by courtesy of the British Information Services. Photographs on pages 19 and 20 by courtesy of Forest Products Research Laboratory, Princes Risborough.

The International Union for the Protection of Nature, formed late in 1948, held an International Technical Conference at Lake Success, 22 August to 1 September 1949. Invitations were issued by UNESCO. A statement on FAO views was submitted which emphasized that in general proper conservation carried out while lands and waters are being used for productive purposes would protect wild birds and animals and also recreational values, though in some areas such additional measures as the setting aside of wildlife reservations are necessary. The conference called attention to the desirability of consultation among heads of international organizations dealing with land and water, particularly FAO, UNESCO, and the International Union. (Photo ***by courtesy of U. S. Forest Service.***)

Commodity Report

Softwood Lumber

This report on softwood lumber deals only with market conditions in Europe and North America which have been the chief source of softwood trade supplies for the rest of the world during the postwar years. It is hoped that future reports can be expanded to cover other areas as well. Other commodity reports on softwood lumber have appeared in UNASYLVA, *Vol. III, Nos. 1, 4, and 6, and Vol. II, No. 5.*

THE beginning of the year 1949 could be described as a period of readjustment in the production and consumption of softwood lumber. Commodity prices, although affected by a number of restrictive factors outside the classic supply/demand pattern, do indicate—if not reflect—the general trend. This period of readjustment in the lumber markets, with a slight leveling off in prices, ended in Europe during the second quarter of the year and in North America during the third quarter. Since then, production, consumption, and trade have shown a firm tendency.

This statement does not mean that there have been no changes in international lumber trade. On the contrary, the increases in the dollar exchange rates in the countries belonging to the "sterling area" and in many other non-dollar countries, which took place during the fall of 1949, have naturally affected the lumber trade. The devaluation measures have widened the gap between the "dollar trade area" and the "non-dollar trade area," and there has been a further decline in North American overseas lumber exports. In theory, this development might augur the appearance of two isolated regions in lumber production and trade, applying different price levels not comparable to each other. It must be borne in mind, however, that many of the more important timber-importing countries need specifications which are obtainable only from North American sources. Moreover, it seems that the North American, particularly the Canadian, sawmilling industry needs the safety valve which traditional exports to overseas countries represent.

Trade in forest products, particularly in lumber, is highly specialized and therefore tends to be conservative. Confronted with a changed price situation, suppliers will try to avoid any sudden switch from traditional markets to new outlets whose dependability is uncertain. It would be misleading, therefore, to attribute the slackening of the transocean lumber trade, which is due to the general dollar shortages and a delay in post-devaluation adjustments, to mutual disinterestedness.

The over-all picture at the end of 1949 indicated potential strong demand for softwood lumber, unfilled housing needs of great magnitude, and a slowing down of the earlier decline in price trends.

EUROPE

Requirements

By July 1949 many European countries had relaxed controls of softwood lumber imports or disposed of them entirely. Even in countries where controls over the use of lumber were continued, increased quantities were permitted to be used per dwelling unit, except in the United Kingdom. Lumber consumption therefore rose, although prices, still considered high, and limited consumer purchasing power helped to keep it below what was thought to be normal.

In Belgium and the United Kingdom building activity during January-June was greater than during the corresponding period of 1948. However, in the United Kingdom the year's target has since been cut by 25,000 houses, representing approximately 40,000 standards of softwood lumber. In Denmark, where the building program for the first half of 1949 was lower than for 1948, construction for the full year is expected to be a little higher than in the previous year.

On the other hand, there was diminished building activity during the first half of 1949 in the Netherlands, Sweden, and France. It is reported that in France a weakening of demand continued during the second quarter of the year and that building activity was severely affected by restrictions on credit. A fall in prices for agricultural products, together with a shortage of money in rural areas, caused the postponement of many non-urban reconstruction programs.

The problem of determining Europe's timber needs is very difficult to solve on any objective basis. Some valuable material has been forthcoming as the result of studies by the Economic Commission for Europe covering housing requirements. In a paper entitled "The European Housing Problem, A Preliminary Review," published by ECE in October 1949, it is stated that in 1948 the need for dwelling replacement in 17 reporting countries alone* was 11.1 million "average dwelling units." The cumulative total of houses

*Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Sweden, Switzerland, United Kingdom.

to replace inadequate houses, to reduce overcrowding to a reasonable minimum, and to repair war destruction was 14.25 million units. The current annual requirements, based on essential needs in the reporting countries, were estimated at very close to one million dwelling units per annum. The implementation of this "necessary program," a program of house construction twice as great as before the war, would meet the aggregate housing needs of the 17 countries in 22 years, with a variation between individual countries of from 6 to more than 150 years. Another program, called the "probable program," based on a realistic estimate of what could be done, increases progressively from 758,000 dwellings per annum in 1948 to 1,275,000 in 1952. In 14 countries which were able to furnish data concerning building material requirements† the aggregate requirements of timber to carry out the "probable" housing program totaled over 1.5 million standards in 1948, as compared with 1.7 million standards used before the war. Implementation of the "necessary" program in the same countries would require over 3.4 million standards of timber per annum, which corresponds to more than 200 percent of the prewar consumption for house construction. While the "probable" program is more or less based upon factual availabilities of construction materials, the "necessary" program predicates a substantially increased output of timber and other raw materials.

The study mentioned above covers only some 43 percent of the total European population, and the data on timber consumption for housing relates to an even smaller proportion. Since the housing problem is very complex in each individual country, the conclusions arrived at for reporting countries cannot be extended to the whole of Europe. It is, therefore, not possible to estimate the total amount of timber needed for house construction in that continent, but it is obvious that European timber requirements for this purpose alone must be placed at a much higher level than present and prospective availabilities.

The ECE Timber Committee at its fifth session in September 1949 noted that the effective demand for softwood timber in Europe continued to be only slightly above production, but that the gap between the continent's supplies and demand could be expected to increase somewhat in the future.

Production

Statistics available for nine months of 1949 indicate an increase by some 17 percent in European softwood

†Those enumerated in the preceding footnote, except Hungary, Luxembourg, and Poland.

TABLE 1.—PRODUCTION AND TRADE IN SOFTWOOD LUMBER

Country	Production		Imports		Exports	
	Jan.-Sept.		Jan.-Sept.		Jan.-Sept.	
	1949	1948	1949	1948	1949	1948
	(Thousand standards)					
EUROPE						
Importing Countries						
Belgium	26	43	63.4	79.8	0.4	1.2
Denmark	56	47	104.1	91.4	0.1	0.3
France	428	455	74.8	112.6	67.6	56.1
Germany:						
Bizone	1,035	618	25.5	1.5	71.6	46.4
French Zone	240	191	—	—	97.7	67.1
Greece	11	9	29.3	23.7		
Hungary	...	...	[1]70.1	...		
Ireland	4	5	39.2	19.1		
Italy	...	...	115.9	46.0	...	0.3
Luxembourg	2	2	1.1	0.7	1.0	0.6
Netherlands	2	3	201.8	157.1	0.1	0.1
Switzerland	154	181	6.5	13.1	0.8	6.3
United Kingdom	[2]50	[2]50	689.5	580.5		
Exporting Countries						
Austria	355	211	0.4	0.1	[3]187.9	[3]65.9
Czechoslovakia	[4]496	[4]518			...	[5]38.4
Finland	622	608			352.3	315.2
Norway	...	[6]210	6.4	11.4	10.0	7.1
Poland	...	372			...	17.3
Sweden	[7]535	[7]480	9.0	11.1	418.0	323.6
Yugoslavia	...	...			115.5	101.3
NORTH AMERICA						
Canada	[7]2,214	[7]2,261			[8]707.5	[8]902.1
United States	11,790	13,890	470.9	647.8	196.7	195.7

NOTE. Owing to the inclusion of later information, some figures in this report may differ from those shown in the quarterly bulletin *Timber Statistics*, Vol. II, No. 3.

... Not available. — None.

[1]Jan.-August only.

[2]Excludes production from imported logs.

[3]Includes prefabricated houses.

[4]Includes sawn hardwood and sleepers.

[5]Jan.-June only.

[6]Three-quarters of the production for the year ending 1 July.

[7]Includes production of hardwoods, and in British Columbia, sleepers.

[8]Excludes shingles.

lumber production over the corresponding period of 1948. The better coal and coke supply to timber-producing countries freed considerable quantities of wood which, in the previous year, had to be used as fuelwood.

The following countries have shown important increases in sawn softwood production during the first part of 1949, compared to the corresponding period of 1948:

	Percentage increase
Finland	2
Sweden	11
Norway*	14
Western Zones of Germany	58
Austria	68

*Difference between half-yearly rates, 30 June 1948 - 1 July 1949 and 30 June 1947 - 1 July 1948.

At the same time, sawn softwood production in France, excluding sawn timber from German logs, declined by 27,000 standards.

The greatest increases occurred in Western Germany and Austria. Production of sawn lumber in Austria during the second quarter of the year was disproportionately high, since the sawmilling industry, anticipating price reductions, worked at full capacity. Production costs increased as a result of a rise in wages and railroad freight rates.

The remarkable increase in sawn softwood production in the Western Zones of Germany was not due to any considerable expansion of lumber exports.

Lumber output in all of the three northern timber producing countries increased as a result of certain favorable circumstances. In Sweden, the adequate supply of sawlogs was due to a good felling season and favorable weather during the floating season. Production in Norway reached a level sufficient to cover the domestic needs of approximately 300,000 standards per year and to permit increased exports. In Finland, during the first half of 1949, the increase in production was slight. The weakening of export prices which occurred last spring caused financial difficulties for a number of small sawmills which were forced to use their log supplies at a more rapid rate than usual.

The expanded exports from Yugoslavia and resumption of exports from Poland and Romania during the first half of 1949 indicate a rise in production in these countries.

Exports

As shown in Table 1, exports of sawn softwood from European countries during nine months of 1949 show an increase of 33 percent as compared with the corresponding period of 1948. The most important percentage increases were:

	Percentage increases
Austria	185
Finland	12
Western Zones of Germany	49
Poland[1]	[2]963
Romania[1]	141
Sweden	29
Yugoslavia[1]	14

[1]As reported by importing countries for the first half of 1949.
[2]Exports were negligible during the first half of 1948.

As is seen from the above percentage figures, the first half of 1949 saw the re-entry of Poland and Romania into the European timber export trade. In addition, the U.S.S.R. has resumed its lumber exports on a large scale, but no exact figures are as yet available, since most of the shipments were made toward the end of the year. One of the more important events in 1949 was the contract, made in August, for shipment of 100,000 standards of lumber from the U.S.S.R. and the Soviet Zone of Germany to the United Kingdom.

In September it was evident that the European softwood exporting countries had made up for the reduction in imports from the dollar area and even supplied additional quantities. Later reports from the northern and eastern European countries seem to confirm that the trend continued through the fall season.

European lumber trade was affected by the great fire in the forests of the Landes region in France, in August 1949. It will make available for foreign markets a quantity of approximately 250,000 standards of sawn maritime pine, the bulk consisting of small size planks. It was hoped to place the salvaged wood on the market as soon as possible. At the end of October an agreement with the United Kingdom for a considerable part of this timber had been reached. A fire which ravaged a big stockyard near Kemi, in northern Finland, in the autumn destroyed about 26,000 standards of sawn timber, corresponding to some 5 percent of the annual exports of sawn timber from Finland.

It is to be expected that exports from Finland and Yugoslavia will increase as a result of the International Bank loans noted elsewhere in this issue. In these loan agreements, Finland agreed to export 420,000 standards of lumber each year between 1949 and 1951, and Yugoslavia 160,000 standards of lumber and 80,000 standards of pitprops. The loan agreements provide for timber payment arrangements whereby designated importing countries agree to make purchases up to certain limits each year, and specified payments for the same are to be made to the International Bank in dollars. Preliminary reports indicate that, in 1949, Finland has exceeded the pledged figure.

Imports

The principal European importing countries received approximately 1,350,000 standards of softwood lumber during the first nine months of 1949, as contrasted with 1,125,000 standards for the same period of 1948. Imports from European areas increased. On the other hand, during January-June 1949, imports from hard currency areas totaled 94,000 standards, almost 130,000 standards less than during the same period in 1948. Imports received by Germany (Trizone), Greece, Ireland, Italy, Netherlands, and the United Kingdom were slightly higher than the corresponding figures for 1948, whereas imports of the other countries were somewhat lower than in 1948.

While imports of sawn lumber increased during the first half of 1949, imports of softwood sawlogs decreased by 390,000 m^3 (r), a quantity of logs sufficient to manufacture approximately 50,000 standards of softwood lumber.

Four major changes in the European lumber trade pattern which occurred during the first nine months

of the year, ought to be recorded in this connection: the continued slackening of imports from North America, resumption of lumber imports to Germany on a large scale, the forthcoming decline of French import needs of softwood lumber, and remarkable increase of imports originating from eastern European countries and the U.S.S.R.

The background of the decrease of lumber imports from the dollar area was dealt with in UNASYLVA, Vol. III, No. 6, and there is no need to repeat its causes. The fires in the Landes region, which had the immediate effect of committing France temporarily to exporting sawn lumber, have already been mentioned. As to the change of Germany from a timber exporting country to an importer, an event which had been anticipated for some time, it may be noted that the opening of those markets occurred in June 1949 when an agreement was signed between the Bizone and the French Zone of Germany, on the one hand, and Sweden, on the other, providing for purchases, before 30 June 1950, of about 65,000 standards of lumber, about 95,000 m^3 of pitprops, 200,000 m^3 of pulpwood, and, in addition, sleepers, telegraph poles, and plywood. This agreement was followed by purchases from Finland and certain other countries.

The increasing importance of imports to western Europe of Russian and eastern European timber is illustrated by contracts made by the British Timber Control. As mentioned above, the United Kingdom contracted, early in August 1949, for 100,000 standards of lumber from the U.S.S.R. and the Soviet Zone of Germany for shipment during 1949. About 70 percent of the lumber bought was to be shipped from the Kara Sea and the White Sea, a fact which gave rise to doubts as to the possibility of securing delivery as scheduled. In addition, negotiations between the United Kingdom and Yugoslavia for the purchase of 70,000 standards of lumber for shipment before March 1950 were continuing, and an agreement with Poland concerning shipment of 75,000 standards was reached. United Kingdom importer circles expect that the greater imports of lumber from the U.S.S.R., Yugoslavia, Romania, Austria, Czechoslovakia, and Poland may in 1950 more than equal all that has been shipped from dollar countries in 1949. As a matter of fact, it is estimated in the same circles that, as compared with 1949, the need for North American timber may decline further and should in 1950 represent only some 15 to 20 percent of the total supply required in the United Kingdom.

Prices

The slight decline in lumber prices during the first three months of 1949 leveled off during the second quarter of the year. On both the export and domestic markets there were no general signs of further price reductions. In France, Switzerland, and Germany the demand for price reduction was due to abnormal circumstances which did not influence the general trend.

It should be noted that ocean freight rates during the first half of 1949 were considerably lower than those prevailing during the corresponding period of 1948. For instance, the freight rates from southern Scandinavian ports to the United Kingdom are said to have been between 20 to 25 percent lower, with resulting lower c.i.f. prices.

The Russian contract made by the British Timber Control provided for a basic price of £42 for 7" u/s redwood battens f.o.b. Archangel. The price fixed by the Timber Control for corresponding Swedish goods during the second quarter of 1949 was £42 10s. It is of interest to note the average c.i.f. values per standard of quantities imported by the United Kingdom:

AVERAGE C.I.F. VALUE OF LUMBER IMPORTED INTO THE U.K., JANUARY-OCTOBER 1949*

Country of origin	*Average value per standard*
Finland	£48 3s. 5d.
U.S.S.R.	£49 16s. 8d.
Sweden	£49 13s. 9d.
Canada	£63 1s. 8d.

*According to Churchill and Simms Ltd., London.

The devaluation of a great number of currencies has upset the price situation to some extent, and, toward the end of 1949, not very much could be said with absolute certainty about future trends. The three northern timber-exporting countries, Norway, Sweden, and Finland, maintained the previous relationship between their respective currencies and the pound sterling while devaluating with respect to the dollar (Finland had, in addition, separately devalued her markka by 17.7 percent in July 1949), and thus the basis of the prices paid by the greatest importer of their timber was not affected. However, there are other factors which cause confusion in relation to prices in wood importing countries. The extent of devaluation varied in different countries, and within one country contracts are often made in different currencies, such as the pound sterling, dollar, and krona. Some time must elapse before a firm trend in prices will be discernible.

Two factors may have particular effects upon the situation. One is the probability of declining competition from Canadian and United States timber in the European and, especially, the United Kingdom market. This absence of strong overseas competition will naturally strengthen the position of European timber-exporting countries. Toward the end of the year 1949 the other factor could be defined merely as a "trend." As a result of devaluation, non-dollar commodities on international markets also showed a more or less general price increase.

As an indication of the development of lumber prices for the opening of the 1950 season, the Swedish round timber auctions in November 1949 showed that, while the average price of sawlogs remained almost unchanged, the price differentiation between grades had increased still further. Reports from other northern European timber-exporting countries also reflected a belief in the persistence of the firmness of the lumber market. The first week of 1950 saw the announcement of a 7.5 percent wage increase in Finland, which is bound to affect the lumber industry.

The opening of Scandinavian export sales for shipment at first open water or later in 1950 has also been favorable for the exporters. Prices for Finnish deliveries to Ireland and Belgium, and for Swedish deliveries to Western Germany and Belgium have been slightly higher than those paid in 1949. Prices to be paid at the beginning of the 1950 season on the most

important markets, the United Kingdom and the Netherlands, are unknown at the time of writing.

The freight market which throughout September and October 1949 was comparatively weak, showed signs of slight strengthening in November.

Outlook

So far there are no indications that consumption of lumber in 1950 by the major European importing countries will differ in any marked degree from that of 1949. Demand can be expected to remain at about the same level.

On the other hand, an improved fuel situation and restrictions on domestic lumber consumption may enable European timber-producing countries to raise their 1950 exports by some 10 to 20 percent above the 1949 figure. Several incentives can be mentioned: increased production in countries which have received special "timber equipment" loans, general stability on a market where no serious competition from dollar countries is felt, and the set-back on the pulp market. The latter factor will result in as little pulpwood and as much sawtimber as possible being cut in Sweden and Finland during the felling season 1949/50. It is also reported from Sweden that, due to the market situation, the minimum dimensions of sawlogs at the November auctions were reduced to 5″ top diameter for pine and 6″ for spruce, compared with minima of 6″ and 8″ respectively a year earlier. The result will be an alteration in the proportions of pulpwood and sawlogs obtained from the cut, in favor of sawlogs.

In a number of eastern and central European countries, such as Poland, Czechoslovakia, Austria, Romania, and Yugoslavia, there is a strong stimulus towards increasing production and exports of softwood lumber, and the resumption of Russian lumber exports in 1949 on an expanded scale can be expected to be followed by larger shipments in 1950.

Consequently, it is anticipated that the shortfall in European softwood lumber supplies due to the import requirements of Germany and the decline in imports from the dollar area may to a considerable degree be balanced by increased supplies from northern and eastern European countries and by temporary exports from France.

In September 1949, the ECE Timber Committee estimated that the difference between export availabilities and import supplies for 1950 would run between an approximate balance and a deficit of 540,000 standards. Due to the French forest fires, the total European import demand was placed at 2.9 million standards, 10 percent below earlier estimates.

North America

Canada

The *production* of softwood lumber (including hardwoods east of the Rocky Mountains) during the first ten months of 1949 was about 2.40 million standards, or about 100,000 standards (4 percent) less than for the same period of 1948. The production of softwood lumber (including sleepers) in British Columbia accounted for about 1.9 million standards of this total and was about 26,000 standards less than in 1948.

Softwood *exports* for the first nine months of 1949 were 708,000 standards,* or about 195,000 standards less than those of 1948 for the same period. Although exports to overseas destinations showed a continuing decline, there were, on the other hand, no clear signs of increased exports to the United States. This situation was expected to change during the latter half of the year, particularly as a result of devaluation. Since the Canadian dollar has been devalued by only 10 percent, Canadian wood, at unchanged prices in Canadian dollars, would have cost about 31 percent more f.o.b. in British, South African, or Australian pounds than before the devaluation. It is obvious that this situation seriously handicaps the competitiveness of Canada's lumber export trade on many overseas markets. It also can be expected to increase the dependence of the country's sawmill industry on the United States markets which have become the main outlet for Canadian lumber exports.

During the first eight months of 1949, lumber *prices* on Canada's domestic market were maintained. In November, however, a trade report indicated that devaluation of the Canadian dollar was already having an effect on the domestic lumber prices in British Columbia, slight increases having been noted. It has also been indicated that in Vancouver higher prices obtained by exporting to the United States might lead to a rise of about 6 Canadian dollars per standard in retail prices.

United States

Consumption of softwood lumber in the United States for 1949 is expected to be somewhat lower than in 1948, 13.76 million standards as compared with 14.36 million standards, according to industry estimates.

There was a general reduction in production of all commodities during the first half of 1949, but production rose during August and September. This was reflected in an upsurge in building activity and an increased demand for lumber. Thus, consumption of softwood lumber, which in the second quarter of the year is estimated to have been 3.65 million standards, is estimated to have reached 3.83 million standards during the third quarter. A slight decline in the consumption figure was anticipated for the fourth quarter, to around 3.59 million standards.

The upturn in lumber demand, felt about the middle of the third quarter of the year, was not immediately reflected in increased *production*. Softwood production, set at 3.49 million standards for the second quarter of 1949, was estimated at 3.48 million standards for the third quarter, 0.2 percent less than the previous quarter and 12.2 percent less than the third quarter of 1948. For the rest of the year the prospects were considered as favorable.

The Lumber Survey Committee, an unofficial committee reporting to the United States Secretary of Commerce, in a report dated 15 November 1949, stated that the minimum wage law providing for payment of at least 75 cents per hour would substantially increase labor costs and have serious effects on sawmill operations in the eastern states and more especially in the southern states in early 1950.

*Excluding shingles.

In August 1949, for the first time since the high figure of August 1948, the composite lumber *price* index in the United States failed to decline from the previous month's figure. Prices of construction lumber also showed signs of firmness. In September there was a slight increase (0.7 percent) in the average wholesale price index of construction lumber.

Toward the middle of the fourth quarter, some fear was felt regarding the eventual effects of the devaluation of the Canadian dollar on United States lumber prices. Canadian exporters were now in a position to ship lumber to the United States at a lower price than the domestic lumber prices prevailing in the United States. It was therefore felt that at the end of 1949 and the beginning of 1950 imports from Canada might have a strong influence on the United States lumber market.

As a result of sharp drops in *exports* to the United Kingdom, Argentina, China, and the Union of South Africa, the total volume of lumber exported from the United States during the first half of 1949 was some 15 percent under the quantity exported during the comparable period of 1948. Exports of softwood lumber in the third quarter of 1949 were at least 8,100 standards higher than those of the second quarter of 1949 (64,400 standards) and 22,500 higher than those of the third quarter of 1948. Although representing hardly more than 2 percent of total softwood production, the export trade is of considerable importance to certain segments of the trade.

On the other hand, *imports* of softwood lumber also showed a considerable decline, namely 25 percent, during the first half of 1949 as compared with the corresponding period of 1948. Third quarter imports in 1949 were 168,300 standards as compared with 244,700 standards for the third quarter in 1948.

Outlook—North America

Official forecasts in mid-1949 estimated the United States total lumber production in 1950/51 at about 16.9 million standards and domestic consumption at some 17.3 million standards. Net imports may total some 900,000 standards in 1950, leaving an export availability of about 500,000 standards. Similar estimates place Canada's export availabilities to countries other than the United States for 1950 at some 800,000 standards.

Forecasts of this sort are easily susceptible to upset. Toward the end of 1949, the following features regarding prospects for 1950 seemed to be indicative.

According to estimates of the United States Department of Commerce, the total value of new construction in the country during 1950 would reach 19,250 million dollars, or about the same level as in 1949. A decline in private construction would be offset by an increase in public construction, which, however, requires comparatively less lumber. There might therefore be only a relatively slight drop in demand for lumber for construction purposes, which accounts for the greater portion of lumber consumption.

Other factors may affect the United States lumber industry. The rise in production costs, due to the minimum wage law, has already been mentioned, as well as the possible effects of Canadian price competition.

The outlook for the sawmill industry in Canada is considered as very favorable. Due to the prevailing situation on the pulp market, it is anticipated that in Canada as in several European countries the pulpwood cut during the felling season 1949/50 will be less and the sawtimber cut will reach or even surpass the level of the 1948/49 season. Domestic demand for lumber, it is believed, will remain firm. The position of Canadian lumber on the United States market is also viewed with optimism. The export of lumber to the United States since September 1949 has been facilitated by the lifting of export controls on all items, with the exception of sawlogs. For the time being, the 10 percent increase caused by devaluation in the value received for Canadian lumber exports to the United States is considered as a cushion sufficiently large to enable Canadian shippers to meet prospective domestic competition on United States markets.

On the other hand, the significance of both Canadian and United States lumber for European and other overseas markets is likely to be further reduced.

The Work of FAO

Fifth Session of the FAO Conference

THE Fifth Session of the FAO Conference was held at Washington, D. C., from 21 November to 6 December, and devoted its attention principally to a review of the world food and agriculture situation, with particular emphasis on problems of surplus commodities, and to the expanded program of technical assistance for economic development.

The Conference rejected the proposal for an International Commodity Clearing House put forward by the Director-General and, instead, established an FAO Committee on Commodity Problems, an advisory body composed of the representatives of 14 governments to give attention primarily to surplus commodity situations arising from balance of payment difficulties. The Conference declared that commodity agreements, where practicable, provide the best method for dealing with current surplus commodity situations or with those which might arise in the near future. In the long run, it was felt, main reliance for dealing with the disequilibrium in world production and trade should be placed on technical assistance for economic development.

The Conference endorsed FAO's full participation in the expanded program of technical assistance for economic development as worked out by the United Nations and the specialized agencies. It gave general guidance to the Director-General as to priorities for the various types of projects and authorized him to carry on preliminary work so as to enable FAO to proceed immediately when special technical assistance funds become available. The priorities recommended were—

First. Measures to secure early increase in the production of food and other requirements of local populations of which there are two main groups: (a) Short-term projects; and (b) Medium-term projects which would begin to give results in the early stages, e.g., training personnel and the development of extension methods.

Second. Measures which would result within the foreseeable future in an appreciable increase in the external income of the countries seeking assistance, e.g., the economic development of natural resources which might result in increased export, reduce the need for such imports as can be economically produced in the country, and generally assist the creation of favorable conditions for investment and the expansion of trade.

Third. Long-range projects, mainly in the research field.

Where several projects are presented in any of the above categories and are considered to be of equal importance, priority should be given to projects of value to more than one requesting country.

All the types of activities listed by the Director-General under "forestry and forest products" were considered appropriate, but priority was accorded to:

1) Organization and execution of forest inventories,
2) Education and training of forestry personnel,
3) Organization of governmental forest services,
4) Reforestation, in the broadest sense of the term,
5) Correct land use, with special reference to problems of shifting cultivation,
6) Industrial aspects of forest development,
7) Organization of forest co-operatives.

This order of priority is to be regarded as flexible and subject to adjustment in the light of the special circumstances of the countries putting forward requests for assistance.

Early in the session, the Conference established three commissions to carry on its detailed work. These were Commission I—World Review and Outlook (Chairman, Viscount Bruce of Melbourne, Independent Chairman of the FAO Council); Commission II—Technical Activities of FAO (Chairman, Mr. Louis Maire, Switzerland); and Commission III—Constitutional, Administrative, and Financial Questions (Chairman, Mr. B. R. Sen, India).

The 1950 program of the Division of Forestry and Forest Products was subjected to a very detailed and competent examination by a special working panel of 22 delegates representing Austria, Belgium, Brazil, Burma, Canada, Finland, Greece, Iraq, Ireland, Italy, Mexico, Norway, Philippines, Portugal, Switzerland, United Kingdom, United States of America, Uruguay, Venezuela, and Yugoslavia. Mr. E. Saari, leader of the Finnish delegation, was elected Chairman of the panel, and Mr. D. T. Griffiths (Burma) served as Rapporteur.

The panel's report, which was later adopted by the Conference, recorded satisfaction with the achievements of the Division and with the methods of work developed over the past three years; approved the progress towards decentralization that had been achieved in line with the recommendations of earlier FAO conferences and, in particular, commended the organization of the regional Commissions for Forestry and Forest Products in Europe, Latin America, and Asia and the Far East. Believing that the work of these Commissions should be adjusted to the needs of each region, the Conference decided not to lay down formal terms of reference. In Europe the present arrangements regarding the division of activities between FAO's European Commission for Forestry and Forest Products and the Timber Committee of ECE were regarded as satisfactory and called for no modification so long as the Timber Committee of ECE continued to carry out the program adopted at its Fifth Session.

As regards forest policy, the Conference endorsed the general recommendations of the Third World Forestry Congress and recommended that a statement of basic principles of forest policy, now being prepared by the FAO secretariat, be submitted for consideration to the 1950 sessions of the regional Commissions and subsequently, with their comments, to the next session of the FAO Conference.

During the two and a half week session, the Conference decided by a small majority to establish FAO's permanent headquarters in Rome. It is not expected, however, that the move can take place before 1951 when the accommodations to be made available by the Italian Government will have been completed.

The Conference admitted five additional countries to FAO membership, Afghanistan, Indonesia, Israel, Korea, and Sweden, bringing the total membership to 63. Belgium, Burma, Pakistan, Yugoslavia, United Kingdom and Venezuela were elected to serve on the 18 nation FAO Council (World Food Council) in place of retiring members. The Conference adopted the principle of biennial rather than annual sessions, and decided that the next session should be held at headquarters in April 1951, unless the Director-General or the FAO Council should decide that circumstances demand holding a Conference in November 1950. The Conference, however, rejected a proposal that, as a regular procedure, its sessions should be held in the spring rather than in the fall as in the past.

The Conference also authorized the Director-General to proceed with the establishment of an appropriate regional organization for Latin America, in agreement with member governments in the area and in consultation with the Organization of American States. It was decided to keep the regional office for Asia and the Far East in Bangkok, Thailand, until the end of 1951, the question of location beyond that time to be reviewed during the next session of the Conference.

A revised scale of contributions for member governments was approved so as to bring the total income of the Organization to $5 million rather than to approximately $4.6 million as heretofore. Finally, the Conference adopted Spanish as a third working language in addition to English and French, although it postponed its introduction until the first session of the Conference following the establishment of FAO at its permanent headquarters.

European Forestry and Forest Products Commission

AT THE first session of the European Forestry and Forest Products Commission, held in 1948, representatives of eighteen countries submitted statements on the progress achieved in the carrying out of their national forest policies. An analysis of the trends revealed in the statements was included in an article published in UNASYLVA, Vol. III, No. 3.

The second session of the Commission, reported in UNASYLVA, Vol. III, No. 6, requested member governments to present information every year on developments in their national forest policies and in their current forestry programs to serve as a basis for discussions by the Commission. A summary of the latest statements made to the Commission in this connection is given below.

Austria

There is no longer any shortage of forest workers, and the expanded program of road construction is making possible the exploitation of many forest areas hitherto inaccessible. Restrictions on consumption of forest products have been removed, and the free availability of coal supplies has reduced the excessive use of wood for fuel. The number of forest co-operatives has increased, and a national organization has now been established.

Czechoslovakia

Control of insect infestations appears to be achieving success. Although about 10 percent of the timber felled at present consists of trees damaged by *Ips typographus*, there is no longer any danger of this bark beetle multiplying to a dangerous degree. To fight the nun moth, *Lymantria monacha*, 21 airplanes and 30 ground sprayers have been used in 1949 over eight different districts totaling 7,500 hectares. The forests of Czechoslovakia are still suffering from the effects of the 1947 drought. About 36 percent of the 1949 cut will be drought-killed timber. With this experience in mind, forest policy is encouraging the establishment of mixed forests. According to the current Five-Year Plan, 76,000 hectares of land not in agricultural use, mostly on watersheds, are to be afforested by 1953. To make forestry as a profession more attractive, training centers are being set up where young men may receive two years' training in all branches of forestry and become qualified forest workers. The most promising pupils are selected for further training in forestry schools.

Denmark

The Government has investigated the cutting possibilities for an area covering 74 percent of the total forest area. It is estimated that the annual cutting rate of timber (exclusive of fuelwood) can gradually be increased during the coming 25 years to a volume 50 percent above the cut of 1947.

France

Particular reference was made to the results of the insect infestation in spruce, and the disastrous fires of the past summer in the Landes district. The outcome of the foregoing is that, whereas in 1939 France was importing about 50 percent of her softwood requirements, there has now arisen a need for disposal of five million cubic meters of softwood, which must be sold in the immediate future. This situation places a heavy burden on the French timber markets and, at the same time, presents a serious danger for the future when the "possibilité" must inevitably be reduced.

Germany (Bizone)

The forest resources census of 1946 was carried out hurriedly and is not reliable. A revised census is now being conducted, including all forests down to two hectares. During the two years 1945-47, fellings amounted to 75 million m^3, or approximately 240 percent of the increment, and 50 percent of the cut was utilized as fuelwood. In 1948, fellings were reduced to 30.6 million m^3 or 197 percent of the increment. Fuelwood amounted to 37 percent of the cut. For 1949 the planned cut amounted to 154 percent of the increment. Considerable progress had been made in the reforestation of clear-cut areas, and latest reports indicate that, given sufficient funds, the areas needing replanting will have been reduced to normal in three to five years. Mechanization of all operations is developing. Seed provenance and genetics are strictly controlled and enforced. Damage caused by the larvae of *Melolontha vulgaris* is causing concern in young plantations and nurseries. Research is largely directed towards raising the productivity of forests by intensive soil studies, improved silviculture, the use of fertilizers, introduction of fast-growing exotics, and genetics. Utilization of waste and avoidance of waste in logging and conversion are also receiving much attention.

Germany (French Zone)

Active measures are being taken for an early reforestation of areas devastated as a result of bark beetle infestations and of overcutting carried out even before the Occupation. In this reforestation, the previous German practice of establishing pure stands is being replaced by one of mixed plantings of hardwoods and softwoods. A corps of forest engineers is being developed through the training of students at the Freiburg University. Forestry scientific societies are becoming active again and are establishing relations with similar bodies in other countries.

Ireland

The total of new plantations created to date by the State Forest Service since its inception now amounts to 124,162 acres (50,248 ha.). Planting was restricted during the war years but has since expanded; 7,927 acres (3,208 ha.) were planted in 1948/49. The State Forest Department has embarked upon a survey of the entire country to ascertain what lands would be more profitable under forestry than under their present use as rough grazing. The Government is, at the same time, embarking upon an extensive scheme of land reclamation sponsored by the Department of Agriculture, and it will be a matter of consultation between that Department and the State Forest Service to determine whether certain lands should be the subject of reclamation or be dedicated to forestry.

Immediate steps are being taken to increase the present area under nurseries from 300 to 900 acres (121 to 364 ha.) and sufficient seeds have been ordered to meet the estimated requirements.

The present intake of trainees into the State Forest School at Avondale will be insufficient for future needs, and enlargement of the premises and accommodation must be undertaken at a very early date. Higher education in forestry will be a matter of consultation with the Department of Agriculture and the Faculty of Agriculture in the National University of Ireland.

At present, no special provisions are made for research, but such will be increasingly necessary in order to discover the relation of individual species to specific soil conditions in nurseries and plantations.

Norway

Felling of commercial timber increased from 6.4 million m^3 in 1947/48 to 7.5 million m^3 in 1948/49. The use of bull dozers for the building of access roads is expanding. Reforestation and afforestation activities are also increasing.

The improvement of living conditions for forest workers has continued, and better homes and forest camps have been built. Power saws are sold by the Government to forest workers at a low price. The courses at the special school for forest workers have been extended from four to five weeks. The extra time has been used for studying power saws. Lectures are also given by a physician in the right use of body, limbs, and muscles in the cutting and peeling of timber. A film has been made by the Norwegian Forest Society contrasting an ordinary forest worker with an efficient worker.

A specialist on forest genetics has been appointed at the Forest Research Institute of Norway. Work on an inventory of valuable stands and elite trees has been commenced. At the Institute a very thorough investigation of different types of power saws has been carried out, and the results are being published. Some experimental work has been done on the transportation of timber by cable.

Forest fire insurance is undertaken by the Norwegian Mutual Forest Fire Insurance Company, which was established in 1912. The insurance company gives compensation for damage to young forest stands not yet mature for felling and also for damage sustained by the forest soil.

Originally, the forest owners obtained the necessary operating funds for their annual fellings in the form of advances from the purchasers of timber. However, since the establishment of their own sales association in 1929, the forest owners

have made themselves independent of credits or advances from the purchasers. With the aid of the Bank of Norway, the necessary funds have been placed at the disposal of the Central Agency for Agricultural Operating Credits. Here, the various sales associations, and also for est owners not belonging to such associations, are able to obtain credit on their timber contracts at a reasonable rate of interest, 2.5 percent per annum at present.

United Kingdom

Planting has been carried out in pursuance of the approved program, and has reached 80 percent of the agreed target figure for the years since 1946. The field work of the census of woodlands has been completed, and volume computations are in progress. It has been necessary to continue fellings at a rate far greater than the estimated "possibilité," but for 1949 there has been a reduction in the amount licensed for felling, and this quantity is to be still further reduced in 1950. Thinning has been accelerated in the State plantations in order to make an increased contribution to current needs, and has been encouraged in the private woodlands. Improved terms have been offered to private owners who are prepared to "dedicate" their woodlands, and there has been steady development in research by all agencies; the research at present undertaken includes that into mechanization of forest operations.

Fifth Meeting of the ECE Timber Committee

THE Timber Committee of the United Nations Economic Commission for Europe (ECE) held its 5th Meeting in Geneva from 19 to 23 September, 1949. Representatives of the following countries took part in its deliberations: Austria, Belgium, Canada, Czechoslovakia, Denmark, Finland, France, Greece, Italy, Luxembourg, Netherlands, Norway, Sweden, Poland, Switzerland, United Kingdom, United States of America, and Yugoslavia. In the absence of the Chairman and the Vice-Chairman, the Committee unanimously elected Dr. Anton Ceschi (Austria) as Chairman for the Session. The Secretariat was provided by the joint FAO and ECE staff.

The Committee heard a statement from Mr. Gunnar Myrdal, Executive Secretary of ECE, in which he outlined the Secretariat's views with regard to the major items to be discussed during the session. The figures and facts assembled by the Secretariat appeared to point toward the following three conclusions:

(a) Europe's production of softwood timber, including the U.S.S.R., continues to be somewhat below effective demand.

(b) There are no signs of a European softwood surplus and even certain indications that the gap between European supplies and demand might grow slightly larger than it has been for the past 18 months.

(c) After some reduction, especially for the lower grades, at the beginning of the year, timber prices have shown a firm tendency. However, a further adjustment of timber prices to the level of the competitive materials might well be in the interest of the timber trade and might be facilitated through a reduction in roundwood values which has already begun. Price reductions for timber are likely to be smaller than for commodities such as coal and steel.

Mr. Myrdal suggested that these conclusions should be checked and discussed by the Committee, since "every standard of softwood bought from Canada or the United States of America increases the European dollar deficit." Because under present circumstances European governments are "compelled to keep the dollar cost of Europe's timber bill, as of other commodities, to a minimum," the basic objective of the Committee should be "to take whatever action is possible to raise non-dollar supplies to the maximum which can be attained without raising the cost to European consumers above that of dollar timber." Alternatively, or in addition, the Committee might have to promote through more rational use of timber a reduction in effective demand, without sacrificing quality standards of performance.

The present equilibrium between European timber demand and supply had been achieved on "a very low level." There still exists "a very serious housing shortage which not only threatens the welfare and social stability of many European countries, but which also interferes with economic recovery. Insufficient and obsolete houses and wrong geographic distribution of workers' dwellings continuously interfere with the productivity of Europe's industries. Sooner or later, construction programs of substantially greater magnitude than present building activities will become necessary, if we want to achieve economic and social stability."

In considering the factors in the present timber market and supply situation and those expected to affect the future situation, there is great urgency in providing immediate outlets for the exceptional timber availabilities caused by forest fires in France. Once the exceptional supplies created by fire have been absorbed, the effect will be to reduce France's annual softwood production over a number of years and to add a corresponding amount to her import needs. Looking beyond 1950, this factor should not be overlooked.

Three measures—absorption of French fire timber, "timber equipment" loans, and more rational utilization of wood—might be sufficient to keep the European timber situation in equilibrium for the next year or two. At the same time, it could be agreed that even the combined effects of these measures would not be sufficient to close Europe's timber gap beyond that period. "I would not be surprised if by 1951, or shortly thereafter, the difference between Europe's production and effective timber demand might run anywhere between 300,000 and a million standards a year and thus call for an annual expenditure of from 50 to 150 million dollars, if all this difference had to be met from North America," Mr. Myrdal said.

He then suggested that the Committee review the conclusions of FAO's Preparatory Conference on World Pulp Problems, which was held last spring in Montreal, for they revealed a number of difficult problems with regard to Europe. In newsprint today the situation is comparable to "hunger amidst plenty." FAO and other United Nations agencies were constituted to prevent such a paradox. The principles in the report of the Montreal Conference for the long-term development of the pulp industry could be paraphrased as follows:

1) Wood pulp should be produced as close as possible to the forests from which the pulpwood is drawn.

2) Whenever possible, the manufacture of pulp and paper should form a continuous process in order to avoid extra cost and high waste. In accordance with this principle, there should be a decreasing trade in wood pulp and an increasing trade in paper and other finished products.

These ideas cannot be put into effect overnight, but if European countries, meeting within the framework of ECE, would co-operate in order to reach these two economically rational objectives through a gradual process of adjustment, this would constitute a very important contribution towards the improvement of Europe's economy.

Under a resolution of the Commission, the Committee would have to decide what, in its judgment, the Committee might do, in the light of economic prospects after 1950, to advance the broad purposes of the Economic Commission for Europe in the field of timber and forest products. Problems of prices and market structure in different industries are the most important and difficult matter before all the bodies of the Commission.

"On the one hand," Mr. Myrdal continued, "long experience has fully clarified the danger to Economic progress and to our standards of life in market arrangements of a cartel character, whether they are private or governmental in form. We clearly do not want to move in that direction. On the other hand, there are certain concrete market problems in the field of timber which may be capable of solution by international agreement. We must strive to consider these problems in ways which positively contribute to the economic well-being of Europe, the steady expansion of its

trade, and the more economic use of its resources.

"You may decide that the supposedly automatic adjustments of the market will suitably protect the interests of producers and consumers, leaving the Timber Committee to study and watch the market, intervening occasionally as particular problems arise. On the other hand, you may wish to explore the potentialities of more positive international action, whether in the form of commodity agreements or otherwise, to deal with marketing problems on a different basis."

In summing up, Mr. Myrdal said: "I have always regarded the collection of statistics and the promotion of technical improvements as, so to speak, the floor of the activities of our Committees. Next come periodic reviews of the situation and outlook, consisting in an exchange of information about plans and forward estimates by delegates meeting regularly in committees. If such reviews reveal the need for further action, committees provide ideal frameworks for the negotiation of multilateral European trade and production agreements, because of their official status as United Nations bodies. Indeed, the lack of secrecy which characterizes such UN negotiations, and the fact that delegations consist of both officials and businessmen, representing producing as well as importing countries, makes it possible to reach arrangements which serve the interests of Europe rather than that of any special pressure group. Such arrangements constitute not only desirable media for action to stabilize Europe's economy, but probably the safest protection against the revival of monopolistic cartels of the prewar pattern."

After reviewing in detail the European softwood situation, the Committee concluded that "European exporting countries may expect to sell all the softwood available for export in 1949, while importing countries would thus be able to cover practically their entire effective demand." The Committee also concluded that "if present estimates proved correct, there should be no danger of a timber shortage in 1950."

The Committee stressed the fact that a substantial change in the European softwood situation might occur when the exceptional timber supplies resulting from forest fires in France have been absorbed. It stated that the "importance of increasing export supplies of softwood for 1951 and beyond therefore remains unchanged."

Pitprop Situation. The Committee reviewed the European pitprop situation and concluded that there might be a surplus of approximately 210,000 cubic meters in 1949. It was of the opinion that the pitprop situation in 1950 should not present any serious problems. Nevertheless, it considered that this situation should be kept under careful review.

Wood Pulp. The Committee noted the report of the Preparatory Conference on World Pulp Problems held in Montreal in April 1949 and concluded that "the information available at this time to the Committee regarding the international pulp situation as it affects Europe called for no action by the Timber Committee." The Committee's report states that "this conclusion was unanimously accepted by the Committee, but certain delegations added . . . reservations."

French Forest Fire Timber. The Committee heard a detailed report from the French representative on the French forest fire disaster and was unanimous in expressing its sympathy to the Government of France. It noted the figures giving the extent of the damage and the fact that for a year or two its effect would be to transform France from a country normally covering half of its softwood needs by imports to a substantial exporter of softwoods.

In accordance with the desire of the French delegate, the Committee merely noted that negotiations had been initiated with several countries for the disposal of the softwood which France is compelled to export. The Committee expressed its willingness to review the matter further should present efforts of the French Government to sell its timber surplus meet with difficulties.

Brazilian Timber Development. The Committee noted the information presented by the Secretariat regarding the possibilities of future softwood supplies from Brazil, expressed interest in the project and the wish to be kept informed about its progress. It assumed that Brazilian producers and exporters would examine the marketing possibilities for their woods in the normal manner. Delegates expressed the hope that Brazilian industrialists would utilize European experience and woodworking machinery.

Future Work Program. Finally, the delegates, in a discussion of the future work program of the Timber Committee, agreed unanimously that the continuing existence of the Committee was "obviously necessary, both in the interests of producing and consuming countries, and, in view of the importance of the timber problem in the economy of Europe." A recommendation to this effect would be passed to the full Commission, with the suggestion that the Committee's terms of reference should be:

1) To continue the collection and publication of adequate statistics on primary forest products.

2) To publish periodic analyses of the timber market situation in Europe.

3) To keep the position of the principal forest products such as sawn softwood and pitprops under close review and to make such recommendations to governments as it may deem necessary as a result thereof.

4) To pay particular attention to the possibilities of the more rational utilization of wood.

Timber Equipment Loans

THE International Bank for Reconstruction and Development has granted two loans totaling $5 million to the Republic of Finland and the Federal People's Republic of Yugoslavia to assist them in developing their timber resources. The loan to Finland is for the amount of $2.3 million and the loan to Yugoslavia for $2.7 million.

These loans are two of a series considered in connection with the so-called timber equipment project developed by FAO, the Timber Committee of the United Nations Economic Commission for Europe, and the International Bank.

The loans, which are to be used to finance the purchase of timber producing equipment, are expected to increase returns from timber production and exports by several times the amount of the sums advanced. The borrowers undertake to export specified quantities of timber at reasonable prices, and will enter into agreements with European importing countries that pledge the latter to pay dollars for a part of their timber purchases—enough, in short, to ensure repayment of the Bank loans which run for only two years. Yugoslavia intends to make such agreements with the United Kingdom, the Netherlands, France, and Italy; Finland, with Belgium, Denmark, and the United Kingdom.

Loans of this kind are the sort of sound, productive investment that the Bank was created to provide. Though small, they will provide the recipients with the dollars needed to develop their own timber resources and supplement the deficiencies of western European countires. At present, European importing countries are forced to restrict their timber consumption to about half prewar levels, though their need of timber for reconstruction has increased. They have had to rely heavily on imports from North America for these inadequate supplies at a heavy cost in dollars. Through increases in the production and export of timber from eastern Europe, dollars will be saved, since the price of timber shipped from the Western Hemisphere is much higher than the prices that would produce profits for European exporters. Thus the loan will not only provide the aided countries with funds for expanding their productive resources but will also reduce Europe's dollar deficit by helping to stimulate a revival of trade between eastern and western Europe.

These two loans provide a heartening example of the potential multiple benefits

to be derived from small capital investments in productive machinery, provided they are carefully selected. Shortages of equipment and obsolescence of sawmill machinery have been major factors in reducing the timber output of European exporting countries. The need for more and better equipment has also been increased by the depletion of the more accessible forests during the war years and the consequent necessity of opening up remoter areas. With the five million dollars of equipment bought with the World Bank loans, it is estimated that the annual increase in the amount of timber exported by Yugoslavia and Finland alone would, if imported from the United States and Canada, cost about 25 million dollars. And those increases are, of course, expected to continue long after the Bank loans have been repaid.

The loan agreements were signed on 17 October by the President of the International Bank, the Minister of Finland in Washington, and the Yugoslav Ambassador. FAO's Director-General and Deputy Director-General witnessed the agreements, and the Director of the Forestry and Forest Products Division attended the formal signing ceremony.

Forestry Education

AN informal meeting of experts on forestry education, held on the occasion of the Third World Forestry Congress, was briefly noted in UNASYLVA, Vol. III, No. 6. The purpose of the meeting was to secure an exchange of views which would assist FAO in furnishing basic directives to countries contemplating the establishment of forestry schools for the first time or wishing to expand their educational facilities.

The following notes summarize the opinions expressed by the experts attending the meeting.

1) *Affiliation of a new forestry school with a university*

It is recognized that it is by no means essential for a forestry school to be affiliated with a university.

Affiliation with a university, however, does offer certain advantages such as established laboratories and library facilities, various other buildings, professors for non-specialized subjects, opportunities for students to take courses outside their special fields, etc. These advantages are especially important in the case of a new school with only moderate resources at its disposal, but some of them can be obtained without affiliation of the school with a university, if both are situated in the same locality.* It should be pointed out, however, that affiliation with a university, or rather, integration of the degrees awarded by the school with the scheme of university degrees is of a certain value to students who, after they graduate from this school, wish to pursue their studies for an advanced degree in a specialized forestry science. It also has a value as conferring a certain status on forestry as a branch of science and a profession. The value of such an affiliation also depends to a large degree upon the educational background required of students before admittance to the school.

2) *Educational background of students and length of studies*

The length of studies at the forestry school depends to an important degree upon the educational background required of the students admitted.

If students have only a high school education, they must necessarily acquire during their stay at the school the general scientific background on which their later technical training will be based. In such instances, three to four years' attendance at the school is essential. In this case, the affiliation of the new school with an existing university is of considerable advantage.

If the students have already completed college or university-level scientific training, the forestry school becomes an applied science school, and the course of study can be reduced to two years.

In some countries where applied silviculture is of long-standing practice, one year of practical experience either with or without supervision by the school is required before enrollment in the school. This one-year requirement of practical experience permits a certain selection of students; those who have started to work in a field for which they are not suited can be eliminated. This requirement does not appear necessary and may indeed not be possible, particularly in new countries, but this type of practical initiation must be given in forestry schools before students graduate.

3) *Number of teachers and students — specialization of professors*

The minimum number of teachers required (for solely technical subjects) should not be less than three, and the various fields of forestry sciences should be divided among them as follows: 1 teacher of Silviculture (covering the influences exerted by forests and forest protection), 1 teacher of Forest Economics (including forest management), 1 teacher of Wood Utilization.

It is highly desirable, however, that the school should have either a greater number of teachers than this or else some assistants. Apart from reasons to be mentioned later, it is important that the staff should not be constantly absorbed by their teaching duties. They should have a certain amount of free time for personal research work to enable them to keep abreast of advances in scientific knowledge generally and in the science of forestry in particular. Obviously, the optimum number of teachers, as the school grows, depends on circumstances.

There is no rigid minimum requirement as to the number of students with which a school could be started and maintained. However, the establishment of a school for a very limited number of students, only twelve per year for example, would render it an extremely expensive enterprise which could be run on a profitable basis only with great difficulty. This difficulty, which arises when the number of students is too small, can be overcome to some extent by providing for enrollment once every two years. Should the number of students be too small, there is also a danger that the faculty may lose interest in the undersized classes, and the stimulus which each student exerts on the rest of his class will not be fully developed.

On the other hand, the number of students should not be too great in relation to the number of teachers, particularly in field instruction. For such work, it is estimated that one instructor per ten students is needed. If this number is exceeded, a sufficient number of assistants should be provided.

4) *Organization of schools by foreign teachers—training of the first teachers abroad—FAO assistance*

Even in Europe, some forestry schools have been organized and started by teachers not native to the countries where the schools were established. The country concerned thus benefited from the past experience of others. However, this can only be a temporary solution, and the country's own teachers may first have to go abroad to receive training.

The consensus of opinion was that it would be advantageous to employ both methods simultaneously.

Special responsibilities devolve upon schools enrolling foreign students, particularly those intending to become teachers in their own countries. In case of inadequate or wrongly-directed training, an entire generation of foresters may suffer in consequence.

American teachers who have had a large number of foreign students in their classes have noted a certain number of difficulties which they have encountered with such students. These include:

a) An inadequate knowledge of the language in which instruction is offered.

b) Inadequate financial backing of some students to enable them to pursue their studies under proper conditions.

c) Insufficient preparation in chemistry, biology, physics, and mathematics.

d) No clear conception on the part of some students of the nature of the profession of a forester or of the work in the particular branch of this profession in which they intend to specialize.

e) Enrollment at such schools by many students because of a desire to immigrate into the country where they are being trained.

f) No clear conception of the normal study routine on the university level and

*It is not always possible to secure this contiguity, since it is important for the school to be near a moderately large forest where instruction and some research can be conducted.

inability or unwillingnes of some students to accommodate themselves to university conditions.

g) Enrollment by some students in schools which cannot give them proper training.

Work already undertaken by FAO and UNESCO will give useful help towards meeting many of these difficulties. Even after this work has been completed however it must be kept carefully up-to-date.

In the training of teachers abroad special care should be taken to ensure that they become familiar with their future duties as educators. From the standpoint of the country sending its students abroad, it would be valuable to have them distributed among several schools, so that the country will eventually benefit from the application of methods best adapted to its own particular requirements.

As regards the foreign student himself, it would be advisable to have him extend his training period either by visiting and taking courses at more than one foreign school or by pursuing further studies subsequent to the regular training period in the form of personal research or preparation for an advanced university degree. The value of this period of additional training for future teachers was particularly emphasized.

It is to be noted that when the first foresters of the Indian Forest Service were trained at the National School for Waters and Forests of France, arrangements were made for these students to take a six-month course in the French Forest Service itself before enrolling at the school for the regular two-year course. During this six-month period, they became acquainted with the practical work of this service while familiarizing themselves with the language in which instruction was to be given.

It would be extremely valuable to facilitate the exchange of teachers among forestry schools of various countries, and FAO can play an important role in this connection.

5) *The curriculum*

a) *General curriculum and specialized courses.* When a school is founded, there is no need, at the outset, to consider offering several different curricula including specialized courses in several fields of forestry science and technology. A general, uniform curriculum followed by all students seems adequate.

However it is most important that such a curriculum should avoid separating silviculture proper from wood utilization studies.

It is undesirable to attempt to cover too many branches. Depending on the situation in each interested country, certain special features should occupy a more important place in the curriculum. For example, in countries where the relatively pressing problems over vast areas are reforestation, flood control, and soil conservation the curriculum should emphasize, particularly, pedology and the protective utility of forests.

b) *A plan for a general curriculum including applied science courses.* For the above-mentioned reasons, it is impossible to formulate a fixed typical curriculum for a new school in advance. Curricula depend essentially upon local conditions in the country concerned.

It has been suggested that, before the founding of such a school, it would be useful for the school officials to contact specialists in the field of forestry education, either directly or through FAO. These specialists would gladly assist with advice as to how to establish a suitably balanced curriculum.

Sufficient emphasis must be given to applied science courses in a curriculum. Aside from the practical work given during these courses, a continuous or discontinuous one-year period of field work is desirable and a minimum of three months is absolutely essential. If this period is comparatively brief, the work performed by the students should be directly supervised by the school. If the period is of a longer duration, students may be allowed a certain amount of liberty.

One of the greatest difficulties with which schools may be confronted is that too many students will enroll who have no knowledge of the requirements of their future profession and who are incapable of assuming such responsibilities. It is absolutely essential that such students be eliminated before graduation.

6) *Libraries, laboratories, and other facilities*

As regards facilities which a new forestry school should have available, stress is laid on the need for a forest. This should belong to the school, and be as extensive as possible, at least of adequate size for teaching requirements. The forest should also be located in the vicinity of the school itself. This last requirement is sometimes rather difficult to fulfill, but at least transportation facilities providing access to the forest should be available.

In addition to the necessary equipment for microscopic observations, laboratories should have suitable accommodations for seeding experiments, sowing experiments, soil analysis, etc. They should include a biology laboratory which may be simple but must be adequate for the number of students contemplated; a drafting and mapping room, particularly necessary in new countries where surveying and sampling work will assume a dominant role in the work; and, finally, a museum with a room for the preparation of collector's items.

Adjoining the forest to be used for instruction purposes, there should be a tree nursery and, if possible, an arboretum.

The school should also have a wood workshop for simple working of wood objects, which is essential in order to illustrate the subject matter of wood utilization.

It should also, naturally, have the usual equipment and instruments used in forestry work, i.e., compasses, calipers, tape measures, etc., as well as surveying and sampling instruments adapted for teaching purposes, and models similar to those ordinarily used in forestry operations.

Finally, the school should have buildings suitable for the installation of a library, and provision should be made at the outset for the future expansion of such a library.

Yearbook of Forest Products Statistics—1949

THE third FAO Yearbook of Forest Products Statistics has now been published. Prepared by the Division of Forestry and Forest Products as part of its regular statistical services, the Yearbook presents information for the years 1947 and 1948 reported to FAO by over 100 countries and non-self-governing territories.

The 1949 volume contains 43 tables on the production, trade, and consumption of roundwood commodities, lumber, plywood, sleepers, wood pulp and pulp products. Included are summary tables of exports and imports by volume and value, and calculations of consumption rates, on a per caput basis, for total roundwood, fuelwood, industrial wood, lumber, and wood pulp.

The FAO program for forest products statistics has yielded results which must be considered encouraging. But, although it has produced a larger body of timely and consistent international statistics than has previously been available, these statistics must still be interpreted with caution. Many countries are as yet unable to supply the needed information and many of the figures reported are known to be only rough estimates. Therefore better information to be received in the future may modify present conclusions.

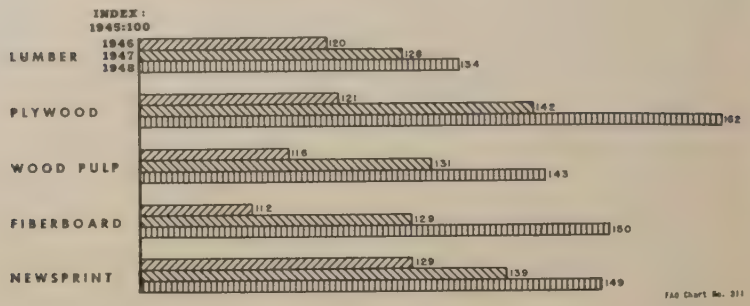
The highlights of these conclusions, drawn from the statistics reported to FAO, are summarized in the text which precedes the tables of the Yearbook. Some of them are given below.

Roundwood Output

World output of roundwood in 1948 is estimated at 1,440 million $m^3(r)$ or 1,000 million metric tons. This is about 0.6 percent greater than in 1947 but 3 percent above 1937, a high prewar year.[1]

[1] In *Yearbook of Forest Products Statistics —1948* the output for 1947 was estimated at 1,450 million $m^3(r)$. In the light of information now available, world output of roundwood in 1947 is estimated at 1,427 million $m^3(r)$. The estimate for 1937 given in the FAO report *Forestry and Forest Products—World Situation 1937-1946* (published in 1946) has also been revised downwards to 1,383 million $m^3(r)$ or about 1,400 million $m^3(r)$.

TRENDS IN WORLD PRODUCTION



A breakdown of roundwood output in 1948 as compared with 1947 shows the variations in production in different regions of the world:

Region	Estimated 1948 output	Change from 1947
	Million m³	*Percent*
North America	360	— 0.3
South and East Asia	298	— 0.7
Europe	280	— 1.8
U.S.S.R.	265	+ 6.0
Latin America	150	—
Africa	51	+ 2.0
Oceania	21	+10.5
Near East and North Africa	11	— 8.3
TOTAL	1.436	+ 0.6

Sixty-three percent of the world's roundwood output in 1948 came from the northern belt of forests, mainly coniferous, stretching across Europe, the U.S.S.R., and North America. The great tropical forest belt, mainly broadleaved, crossing Africa, Southeast Asia, and Latin America, produced only 34 percent of the roundwood output.

Wood in the world economy

Output of roundwood is compared with world output of some other basic commodities in the following table:

Commodity	Estimated 1948 output*	
	Million m.t.	*Percent of prewar†*
Coal and lignite	1,500	110
Roundwood	1,000	103
All grain	545	117
Crude petroleum	466	166
Crude steel	153	113
Natural fibers	11	89

*SOURCE: United Nations, *World Economic Report*, New York, 1948.

†Grain and fibers: 1935-38 = 100; other commodities: 1937 = 100.

Roundwood categories

Data for 1948 reported to FAO cover about 56 percent of the estimated world output of roundwood. The percentage breakdown of these reported figures by categories is shown against the corresponding percentages for 1947 in the following table:

	1948	1947
	(....*Percent*....)	
Sawlogs and veneer logs	38	39
Pulpwood	13	13
Pitprops	3	2
Poles, piling, and posts	2	2
Hewn sleepers	1	1
Fuelwood, etc.	43	43
	100	100

Roundwood output may also be expressed in terms of primary products. On this basis the estimated total world output for 1948 breaks down into:

	Percent
Lumber	23
Wood pulp	8
Other industrial wood	12
Fuelwood	57
	100

Output per hectare

The following figures show regional averages for roundwood output in 1948 per hectare of accessible productive forest:[2]

	m³(r)	*Metric tons*
Europe	2.5	1.8
South and East Asia	1.8	1.3
North America	1.2	0.8
U.S.S.R.	0.9	0.6
Oceania	0.9	0.6
Near East and North Africa	0.7	0.5
Latin America	0.4	0.3
Africa	0.4	0.3
AVERAGE	1.0	0.7

This average is a low figure. In certain areas, particularly tropical Africa and Latin America, the per hectare output could be several times the average in the temperate zones; it is now substantially less.

It is to be noted that Brazil, the British Commonwealth, the U.S.S.R., and the United States of America hold responsibility in the aggregate for over 85 percent of the world's productive forest area, including those parts which are still unexploited. A substantial rise in forest output could therefore be effected by a relatively small group of nations.

WOOD CONSUMPTION

Total supplies of wood available for consumption in 1948 are estimated to be 4 percent greater than before the war. On a per caput basis they are still 6 percent below 1937, owing to population increases.

INDEX NUMBERS OF WOOD SUPPLIES AVAILABLE PER CAPUT

Region	1948	1947
	(....*1937 = 100*....)	
Europe	89	90
U.S.S.R.	91	86
North America	99	100
Latin America	82	84
Africa	97	96
South and East Asia	89	90
Oceania	168	157
WORLD AVERAGE	94	94

Consumption standards appear to be above or near the prewar level only in North America and Oceania. They are still below prewar levels in most of the world, and are in fact deteriorating in several underdeveloped countries.

There are naturally wide variations in the rates of wood consumption of different countries. The rate is over 4 m³(r) per person in Finland and Canada; around 2 m³(r) in Norway, the United States, Brazil, Australia, and New Zealand; around 1 m³(r) in Switzerland, Chile, Uruguay, Southern Rhodesia; about 0.5 m³(r) in France, United Kingdom, and Japan; around 0.25 m³(r) in Ireland, Turkey, Venezuela and Malaya. Consumption in Egypt, Colombia, Ceylon, and India is very small.

Consumption of industrial wood is significantly greater in North America, Oceania, and Europe, which contain 24 percent of the world's population, than in the so-called underdeveloped regions which hold 68 percent of the world's people. Many of the underdeveloped countries use wood mainly for heating and energy production, although wood as ordinarily used is not an economical fuel.

WORLD TRADE

The wood distributed in 1948 in one form or another through international channels of trade represented about 7 percent of the estimated total roundwood output for that year, and 10-11 percent of the reported output.

Index numbers for 1948 of the volume of exports of lumber and wood pulp, the two most important primary forest products entering into foreign trade, are as follows:

Region	Lumber	Wood pulp
	(....*1937 = 100*....)	
Europe	49	56
U.S.S.R.	6	13
North America	91	162
Latin America	279	—
Africa	131	—
South and East Asia	20	—
Oceania	441	—
WORLD AVERAGE	54	74

In 1948 forest products constituted about 5 percent of the total value of world exports of all commodities. The value of the trade of countries reporting to FAO is shown in the table below. The figures are not truly comparable owing to differences in coverage.

Commodity	Exports 1948	Exports 1947	Imports 1948	Imports 1947
	(*Million US$ at current prices*)			
Lumber	628	687	704	687
Wood pulp and pulp wood	740	617	696	590
Pulp products	1,024	958	832	766
Other industrial wood*	232	309	345	374
Fuelwood	3	3	8	3
Other wood products	136	135	73	83
TOTAL	2,763	2,709	2,658	2,503

*Includes pitprops; poles, piling, and posts; sawlogs and veneer logs; sleepers; staves and barrels; veneer and plywood.

In 1948 lumber accounted for about 23 percent of the value of all forest products

[2]Data for forest areas taken from the FAO report *Forest Resources of the World*, Washington, 1948.

exports, pulpwood and wood pulp for 27 percent, and pulp products for 37 percent.

Trade balances of selected countries for 1948, as calculated from reported data, are as follows:

Country	Exports	Imports	Balance
	(.....Million US$.....)		
Europe			
Sweden	563	27	+536
Finland	403	1	+402
Norway	126	19	+107
Austria	49	5	+ 44
Italy	16	40	— 24
Switzerland	4	45	— 41
Denmark	4	67	— 63
Belgium	15	88	— 73
United Kingdom	97	709	—612
Near East			
Turkey	2	15	— 13
North America			
Canada	949	41	+908
United States	252	957	—704
Latin America			
Brazil	54	33	+ 21
Venezuela	*	14	— 14
Africa			
Southern Rhodesia	2	10	— 8
South and East Asia			
India	2	59	— 57
Japan	4	5	— 1
Thailand	7	3	+ 4
Oceania			
New Zealand	2	20	— 18

The relationship of the 1948 trade in wood and wood products to the value of the total foreign trade of certain countries is shown below:

TRADE IN WOOD AND WOOD PRODUCTS

As percentage of total exports		As percentage of total imports	
Sweden	51	United States	13
Finland	96	Denmark	9
Norway	30	United Kingdom	8
Canada	31	Belgium	4
Austria	25	Switzerland	4

The principal exporting areas of forest products are North America and northern Europe.[3] The percentage distribution of exports of lumber and wood pulp from these areas for 1948 is shown below:

Destination	Lumber: North America	Lumber: Northern Europe	Woodpulp: North America	Woodpulp: Northern Europe
	(..... Percent .....)			
Europe	25	79	11	74
U.S.S.R.		9	—	3
Near East and North Africa	1	6	—	*
North America	54	—	86	15
Latin America	7	*	2	5
Africa	7	3	—	*
South and East Asia	2	*	*	1
Oceania	4	3	1	2
TOTAL	100	100	100	100

—None.
*Small.

The principal importing area of the world is Western Europe, with the United Kingdom having the largest volume of foreign trade. The origin of imports of lumber and wood pulp into Western Europe for 1948 is shown below:

Origin	Lumber	Wood pulp
	(....Percent....)	
Europe	71	88
U.S.S.R.	4	1
North America	22	11
Latin America	1	*
Africa	1	
South and East Asia	1	
Oceania	*	
TOTAL	100	100

—None.
*Small.

The above tables clearly show that foreign trade in forest products is mainly intra-regional in character. About 60 percent of the 1948 exports recorded from countries of Latin America and South and East Asia were also directed to other countries within the same region. On the other hand, about 85 percent of reported African exports, mainly sawlogs and veneer logs, went to Europe and North America.

[3]Sweden, Finland, and Norway.

LUMBER

Production

World production of lumber in 1948 is estimated at around 193 million m^3(s) or 41.3 million standards, an increase of about 4 percent over the 1947 estimate of 184 million m^3(s) (39.4 million standards). This is mainly accounted for by expanded production in the U.S.S.R. A slight decline in production in North America was offset by an increase in Europe.

The percentage breakdown of world lumber production by regions for 1947 and 1948 is as follows:

	1948	1947
	(.... Percent ....)	
North America	52	54
Europe	21	21
U.S.S.R.	12	9
South and East Asia	8	9
Latin America	4	4
Oceania	2	2
Other Regions	1	1
	100	100

Reported lumber production for 1948 amounted to 156.7 million m^3(s) (33.5 million standards), about 1 percent greater than in 1947. Coniferous (softwood) lumber accounted for 77 percent of this total.

Consumption

Apparent lumber consumption of reporting countries for 1948 was 156.7 million m^3(s) (33.5 million standards), about 9 percent above the 1947 figure. With the exception of Latin America and the Near East, all regions show increased consumption, but the upward trend is slow. Extensive housing and construction needs remain to be satisfied.

There are wide variations in rates of lumber consumption, not only between the different regions but also between countries within the same region. This is illustrated by the following figures for 1948, showing consumption on the basis of cubic meters of sawn wood per person:

North America (average 0.60)	
Canada	0.64
U.S.A.	0.60
Oceania (average 0.42)	
New Zealand	0.61
Australia	0.38
Europe (average 0.17)	
Finland	0.37
Sweden	0.36
Switzerland	0.28
United Kingdom	0.15
France	0.13
Poland	0.11
Portugal	0.08
Hungary	0.04
Latin America	
Chile	0.11
Venezuela	0.09
Brazil	0.04
Dominican Republic	0.02
South and East Asia	
Japan	0.11
Philippines	0.06
Malaya	0.03
Africa	
Southern Rhodesia	0.04

Stocks

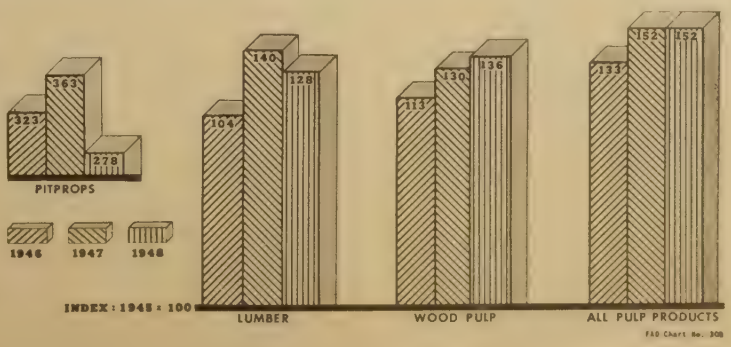
Lumber stocks of reporting countries as of 31 December 1948 had decreased by 0.3 million m^3(s) (64,000 standards) below the level of the previous year. Softwood lumber stocks decreased in almost all countries, with the exception of Canada and some countries of Europe and Latin America. Stocks of hardwood lumber generally appeared to increase.

World trade in lumber

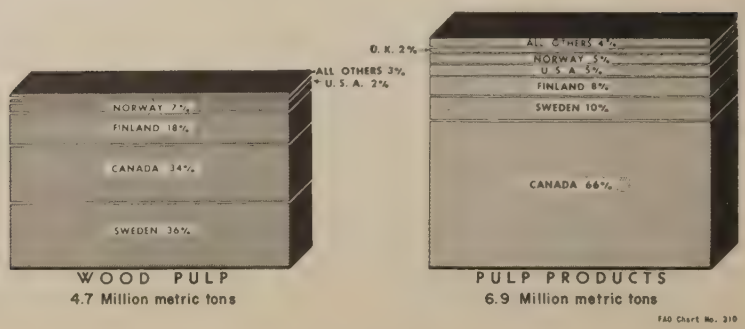
There was a decline of 6 percent in the total of reported lumber exports for 1948, compared with 1947, due mainly to decreased exports from North America. Exports represent about 10 percent of the volume of lumber production reported for 1948 and 23 percent of the value of reported trade in forest products.

Nearly 54 percent of international trade in lumber takes place within the two principal lumber-consuming regions, Europe and North America. Another 11 percent is represented by movement of lumber from North America to Europe. Imports reported as originating from the U.S.S.R. in 1948 totaled 454,000 m^3(s) (97,000 standards), compared with 138,000 m^3(s) (30,000 standards) in 1947.

TRENDS IN EXPORTS



EXPORTS OF WOOD PULP AND PULP PRODUCTS, 1948



Some of these imports may have come from the Soviet Zone of Germany.

Exports

The volume of exports reported for 1948 is 17.6 million m^3(s) (3.8 million standards), of which 15.8 million m^3(s) or 3.4 million standards were coniferous (softwood) lumber. The volume reported for 1947 was 18.7 million m^3(s) (4.0 million standards).

About four-fifths of all coniferous (softwood) lumber exports for 1948 originated from Canada, the United States, Sweden, Finland, and Brazil. Reported lumber exports were distributed as follows:

Destination	1948	1947
	(....*Percent*....)	
European countries	48	57
United States	24	16
Latin America	9	8
Other destinations	19	19
	100	100

Imports

Lumber imports into the United Kingdom, traditionally the principal lumber importing country, declined in 1948 to 4.70 million m^3(s) (1,006,000 standards). This total was surpassed in the United States, where imports were exceptionally high and reached 4.78 million m^3(s) (1,023,000 standards).

Sawlogs

The major lumber-consuming countries also import quantities of sawlogs for further conversion. Imports (including veneer logs) for 1948 totaled 5.60 million m^3(r), of which 25 percent was reported by the United States and Canada and 60 percent by European countries. European imports included 0.92 million m^3(r) of coniferous (softwood) sawlogs from Germany.

The major importers were:

	Total	Coniferous	Broadleaved
	(.....*Million*	m^3(r).....	)
France	1.22	1.06	0.16
United States	1.16	0.70	0.46
United Kingdom	1.10	0.66	0.44
Netherlands	0.46	0.30	0.16

Wood Pulp and Pulp Products

Wood pulp production

World production of wood pulp in 1948 is estimated at nearly 28.6 million metric tons, over 9 percent higher than the total of 26.1 million tons calculated for 1947 and almost 2 million tons above the prewar (1937) record.

Figures reported to FAO totaled 26.4 million tons, the estimated proportion by grades being 33 percent mechanical pulp, 29 percent sulphite pulp, 30 percent sulphate pulp, and 8 percent all other grades.

The principal wood pulp producing regions are North America and Europe, where five countries produce 86 percent of total world output. The United States and Canada (including Newfoundland), which in 1937 produced 45 percent of world output, in 1948 produced 67 percent. Production in Europe dropped from 47 percent of world output in 1937 to 26 percent in 1948.

Consumption of wood pulp

Wood pulp consumption by regions (excl. U.S.S.R.) for 1948 (including pulp equivalents of pulp products) show the following changes compared with 1937:

	1948	1937
	(....*Percent*....)	
North America	70	48
Europe	20	39
Latin America	3	3
Asia	3	6
Oceania	2	2
Africa	1	1
Near East and North Africa	1	1
TOTAL	100	100

Although Europe and most other parts of the world were short of paper and other pulp products, a market surplus of pulp was experienced in 1948, owing to lack of purchasing power and currency restrictions. Statistics on consumption and trade of wood pulp reflect the commercial situation only, and are not a true measure of consumer needs for pulp products, such as newsprint, packaging materials, building boards, and rayon fabrics.

Relative consumption levels of pulp products for 1948, in terms of kilograms of wood pulp per person, are illustrated by the following figures:

High	*Kilograms per caput*	*Medium*	*Kilograms per caput*
United States	120	New Zealand	46
Finland	87	Australia	43
Canada	84	Belgium	30
Sweden	82	United Kingdom	27
Norway	75	*Low*	
		Uruguay	13
		Egypt	3

World trade in wood pulp

There was a slight increase in wood pulp exports reported for 1948, the total quantity amounting to 4.7 million metric tons as compared with 4.5 million tons in 1947. Exports from European countries increased from 2.8 million tons in 1947 to almost 3 million tons in 1948, the main exporters being Sweden (1.7 million tons), Finland (858,000 tons), and Norway (346,000 tons). Canada's exports of wood pulp, including those from Newfoundland, increased from 1.58 million in 1947 to 1.67 million tons in 1948, 88 percent going to the United States.

The value of wood pulp exports reported for 1948 amounted to US$687 million and accounted for one quarter of the total value of all reported forest products exports. In 1948 the United States was by far the greatest importer of wood pulp (2.0 million tons), followed by the United Kingdom (1.2 million tons).

News of the World

The items appearing here are condensed selections of news thought to be of interest to readers of UNASYLVA. *They are grouped alphabetically by countries under headings currently used by the Division of Forestry and Forest Products for reference purposes. The Editor will be glad to receive direct from readers authenticated items of interest and of news value for this part of the review.*

General

ARGENTINA

• On 2 July 1949 a decree was issued by the Argentine Government establishing a National Commission on Forestry Education to formulate a plan of extensive public education on forestry. The Commission is made up of one representative from each government department, one from the municipality of Buenos Aires, one from each province, and one representative of the private forestry organizations. The executive committee in charge of implementing the plan will be presided over by the Minister of Education and will include representatives of the Departments of Agriculture, Interior, Defense, Public Works, Transport, Industry and Commerce, and of the municipality of Buenos Aires.

DOMINICAN REPUBLIC

• Information regarding Dominican forest resources has been published by the National FAO Committee in a document describing the geography, topography, and different forest regions of the country. Data concerning the growth and use of some fifteen of the more important species are also included. The forest policy of the country is outlined, and the development and possibilities of the timber trade are summarized. A number of statistical tables show the production, import, and export of forest products. The report also contains a reprint of FAO publications and recommendations regarding forestry and forest products. It thus serves two useful purposes—to make available up-to-date information about the forest situation of the Dominican Republic and to broaden the knowledge of those inside the Republic of the work of FAO.

ITALY

• Reforestation and vocational training programs will be financed with 10 thousand million lire (about $17,390,000) from the Italian counterpart fund built up under the Marshall Plan. Five thousand million lire will be spent on restoring Italy's war-damaged forests, increasing production of timber and other wood products, and establishing forestry training courses. Under the program, 60,000 unemployed persons will be trained and employed in 740 reforestation centers throughout the country.

UNION OF SOVIET SOCIALIST REPUBLICS

• "Making the cities green" has become the popular slogan of a widespread movement to create parks and to plant trees along city streets, highways, and boulevards, and forest rings around cities. Some 7,500,000 hectares of forests close to the cities have now been designated as city parks. Where there are no natural forests nearby, planting is undertaken, especially in the prairie region. The city councils are the primary movers for creating forest belts around the cities. In the Republic of Uzbek the Council of Ministers has assigned close to 15,000 hectares of land to be planted to parks around Tashkent, Fergana, and other cities. The Kerghiz Republic has some 500 hectares already assigned for park purposes, and more areas are being surveyed under the program. Large parks projects are under way around the cities of Baku, Erivan, and others.

Fundamental Science

UNITED STATES OF AMERICA

• The Northeastern Forest Experiment Station has published a summary of research literature on the effects of defoliation on growth of certain conifers. The purpose of the survey was to determine what additional research should be carried out. One conclusion to be drawn from the literature reviewed is that defoliation of the crown, whether by fire, insects, disease, or other causes, immediately diminishes the increment, the reduction in growth being directly proportional to the degree of defoliation. Reduction in diameter growth is usually greatest near the base of the tree and less in the upper part of the stem. The tree's prospects for survival and resistance depend to a large extent upon its vigor before defoliation. There are, however, exceptions to some of these general rules. Some species, such as spruce, fir, and larch, increase growth at the base of the stem during the year following defoliation caused by fire. There are also exceptions among certain other species to the rule of maximum loss of growth at the base of the tree. Finally, it has been noted that certain pines (*Pinus palustris* and *Pinus caribaea*) can survive total defoliation caused by fire. It would be of value to know the reasons for such exceptions and to determine whether they apply also to other species.

UNION OF SOVIET SOCIALIST REPUBLICS

• For a number of years occasional observations have been reported of a unique, mutually beneficial symbiosis between the common brown mound-building wood ant (*Fomica rufa*) and spruce and birch trees. The ant hills, when opened, are found to be filled with a thick network of intermingled fine rootlets of the trees, around the base of which the mounds are built. The branchlings at the end of the roots, contrary to the habit of roots to grow downward, actually grow upward. The trees whose roots are enmeshed in the ant hills appear in better condition, on the whole, than the neighboring trees which have no ant hills at their base. (The same effect has been observed in the case of some berry-producing plants (*Rubus saxatifolis*), which grow luxuriantly in proximity to ant hills and less so where they lack them.) The reason is that, while the ants find among the roots a ready-made and living structure into which they can easily build their galleries and numerous passages, these galleries, in turn, provide access for air into the relatively compact forest soil in which the northern spruce and birch grow. Thus the trees benefit by better soil aeration—an important factor for plant growth.

• The giant Sequoia (*Sequoia gigantea*) grew naturally in the Crimea during the cretaceous and tertiary eras, but completely disappeared during the glacial period. During the middle of the last century it again appeared, this time as an introduced planted tree. It is planned now to plant Sequoia on a large scale on the southern shores of the peninsula that lie between the sea of Azov and the Black Sea, where it grows well at elevations between 0 to 400 meters above sea level. The climate of southern Crimea corresponds closely in average annual temperatures, absolute minimum temperatures, and annual precipitation to the climate of the natural environment of the "big tree" in the California Sierras at

altitudes between 1,900 and 2,440 meters. The only difference is that the precipitation is more uniformly distributed throughout the year in the Crimea than in the Sierras. Sequoia in the Crimea begins to bear seed at the age of 35 to 40, but bears most abundantly at the age of 70 to 80. The number of cones per tree runs into hundreds, if not thousands, and each cone contains on the average 150 seeds. But the viability of the seed is low (only from 5 to 10 percent), a feature that also characterizes the Sequoia in the Sierras (15 percent). On the whole, the Crimean foresters are of the opinion that the giant Sequoia can be successfully grown on the southern shores of the Crimea from local seed at elevations from 200 to 400 meters and perhaps even more successfully at higher elevations, where it has not yet been introduced.

• Another species that has been successfully transplanted is the giant western red cedar (*Thuja plicata* or *T. gigantea*), whose natural habitat is along the Pacific Coast from northern California to British Columbia. It was introduced for the first time into the Ukraine in 1870. Today, it is growing in many places, and the largest specimens at 70 years of age reach 22 meters in height and 36 centimeters in diameter. It has withstood the exceptionally cold winters of the last years. It produces good seed, which is now being used for further propagation of the species. Experience with exotics points to the conclusion that similarity of climates is not a sufficient criterion in introducing new species. An introduced species often shows a greater degree of adaptability than would be anticipated from the area of its natural distribution. So far *Thuja* has been planted only as a decorative tree in parks and in arboreta, but it is planned now to introduce it into forest culture. The most suitable region for it is thought to be western Transcaucasia, Ciscaucasia, the foothills of the Carpathian Mountains, and southern and southwestern White Russia.

• The conifer forests of the European part of the U.S.S.R. occupy a very large area, but they are limited to a relatively few species. Recent studies of their composition have revealed in the northern forests some large areas of a conifer tree to which little attention has been paid in the past, namely *Juniperus communis*. In Russia it is called *kipariss*, or cypress, although it is not a true cypress. Ordinarily of small growth, in some parts of northern Russia it reaches a height of 10.75 meters and a diameter of 19 centimeters at the base. Sometimes the juniper forms solid stands; for instance, there is one such stand which contains some 1,032 trees per hectare, ranging from 3 to 15 centimeters in diameter breast high. The average age of the stand was 63 years, the average height 5.9 meters, diameter 5.7 centimeters, and volume 9.3 cubic meters. The tallest tree in the stand was 12.8 meters high, with a diameter of 15.5 centimeters at 114 years of age. The only use now made of the juniper wood is locally for fence posts and wooden crosses in cemeteries. But with its fine grain, its attractive reddish color, and its narrow strip of fragrant sapwood, the wood lends itself to many other uses. It is easily worked and takes a good polish.

Silviculture and Management

Canada

• A recent survey of silvicultural studies conducted by member companies of the Canadian Pulp and Paper Association, although it does not cover areas west of the Rocky Mountains, describes an array of projects dealing with natural regeneration, artificial regeneration, reproduction cuttings, growth studies, wind damage, slash disposal, and site classification, and summarizes work undertaken by these companies in Newfoundland. The survey points out that companies may have depended unduly on governmental research, though their own great stake would clearly justify far more active attention to silvicultural research. It is suggested that each company could well set aside an experimental forest, professionally managed, on which the results and costs of various methods in use or under consideration might be studied.

Southern Rhodesia

• The main program of afforestation in Southern Rhodesia is concerned with exotic conifers since the territory is naturally deficient in softwoods. There are now 8,130 acres (3,290 ha.) under conifers. The annual rate of planting is to be increased from the present 1,400 acres (570 ha.) to 3,000 acres (1,200 ha.) by 1951. The area set aside for afforestation is 50,000 acres (20,000 ha.), but the aim is 85,000 acres (34,400 ha.) of growing stock within the next thirty years.

Mensuration, Increment, and Yield

Union of Soviet Socialist Republics

• Between 1921 and 1944 more systematic forest maps were published in the Soviet Union than in the previous 120 years. Considering that the U.S.S.R. occupies nearly one-sixth of the world's land surface (extending 11,000 kilometers from east to west and 4,500-5,000 kilometers from north to south) and that a large part of the country is forested, the need for accurate forest maps is obvious. In 1923 a map of the forests of the European part of the R.S.F.S.R. (Russian Republic) was printed on a scale of 1:4,000,000. In 1926 another map appeared, covering the forests of the European part of the entire U.S.S.R. on a scale of 1:2,520,000. In 1938 the first volume of the monumental Soviet World Atlas was issued. Out of the 168 maps in this Atlas, four were forest maps: a world map of the forest and paper industries on a scale of 1:80,000,000; a map of the forests and the timber and paper industry of the Asiatic part of the U.S.S.R. (scale 1:20,000,000); and two maps showing the forests and the timber and paper industry of the European part of the U.S.S.R. (scale 1:7,500,000). During the years 1941-44 a schematic map of the forests of western Siberia (scale 1:1,000,000) and several other regional maps appeared. These maps, however, prepared by various unrelated agencies, without a central plan, lacked many essential features. They are, therefore, considered inadequate, and serve only for general orientation. In 1944 the Government charged the Institute of Forestry of the U.S.S.R. Academy of Science with the task of formulating a unified plan for the preparation of forest maps. After a year's work the Academy made the following recommendations: (1) That an all-Union Administration of Forest Cartography, with local branches in the various Republics, be created in the Ministry of Forestry. (2) That a large number of specialized cartographers of high and medium qualifications be trained. (This problem is to be solved by enlarging the courses of cartography at the forest schools of University grade and also at some of the engineering schools.) (3) That certain uniform standards for the preparation and printing of maps be adopted. (4) That four types of maps be issued—general, regional, local, and thematic. The general maps, which are to be made to a scale of 1:2,500,000, are to show the different forest regions and the geographic distribution of the dominant species, and are to serve as a basis for determining the broad problems connected with the development of national forest policies. Because of the size of the country, general maps will have to be prepared for separate parts of it—such as the European part of the Russian Republic, Siberia and the Far East, the Caucasus and the Middle Asiatic Republics, and Transcaucasia—at a scale of 1:1,000,000 or 1:2,000,000. Regional maps, of which there are to be some 150, will correspond largely to the political subdivisions of the country—the various republics, provinces, etc.—at a scale from 1:300,000 to 1:1,000,000, depending on the available information and the size of the territory. Local maps are largely maps of forest administrative units (Timber Trusts). They are to be, wherever possible, on a scale of 1:300,000 or even larger. Finally, so-called "thematic" maps are to show, for instance, the location of especially valuable species, areas of latex-containing plants, forest areas serving as sources for certain foods, etc.; for the present only 20 to 25 such maps are to be issued in the form of an atlas.

• Aerial forest surveys have now become the only practical method of obtaining data on the extent, location, and character of the vast unexplored forests of the U.S.S.R. Some 410 million hectares of forests have so far been covered by aerial surveys. More than half of this area lies in the Far East in the basins of the rivers Yenisei and Lena. In European Russia the forests in the basins of the Mezen and the Pechora have been entirely covered by aerial surveys. However, large forest areas still remain unsurveyed. Although some parts of the country within the last few years have been covered by aerial photographic maps, aerial photography in forest surveys is still used only to a very limited

extent. Using the best available topographic maps for the region as a basis, an outline map is prepared to the scale of 1:200,000. On it the two observers, one at each side of the airplane, sketch in the character of the landscape, the location of the different types of forest, and any other natural landmarks. The flights are arranged along parallel lines 4 kilometers apart and at a height of 400 meters above ground. The observers are supposed to sketch in about 70 percent of the distance between the airlanes. Depending upon the character of the territory, the intervals between the parallel lines of flight are increased to 6-7 kilometers with a corresponding increase in height of the flight. Before the actual aerial survey starts, the crews are trained on the ground and from the air to distinguish differences in stands, their density, etc. Often an aerial reconnaissance is made at a height of 1500-2000 meters at intervals of 16-20 kilometers apart to get a general idea of the lay of the land and to determine points of orientation. The flight routes are laid out perpendicularly to some clearly defined boundary, usually a river. The location of the airplane is determined at any moment by its speed and the time it takes it to cross the distance between two known points, and by the distance from the base line. The data are later compiled in the form of a forest map to the scale of 1:500,000. The accuracy for large areas is plus or minus 20 percent, sufficient for preliminary orientation. For small areas the margin of error is much greater. This, of course, is true also for surveys obtained by the statistical method on the ground.

Aerial surveys produce far quicker results than ground surveys. A crew of three in an airplane in a one-hour flight can cover an area of 25,000 to 47,000 hectares, and during the field season an area of 2.5 to 3.5 million hectares. To survey 2.5 million hectares by the statistical method would require 21 forest experts and 130 workers. Moreover, the statistical method does not show the location on the ground of the different forest types. Besides being more productive, the aerial survey is also cheaper; the largest item in its total cost, accounting for 30 to 50 percent, is the cost of operating the airplane.

Protection

Canada

• In view of the heavy damage caused by the spruce budworm (*Cacoecia fumiferana*) in the pulpwood forests of central and eastern Canada, the forest authorities of Ontario have made special surveys to determine susceptibility to its attacks. In an area of 3,500,000 acres (1,410,000 ha.) the composition of the forest was found to be as follows:

White spruce (*Picea glauca*)	8.4%
Black spruce (*Picea mariana*)	47.3%
Balsam fir (*Abies balsamea*)	9.5%
Jack pine (*Pinus banksiana*)	17.9%
Birch	9.9%
Poplar	7.0%
	100.0%

White spruce and balsam fir, which together total 17.9 percent of the stand, are the species affected by the budworm. In the area surveyed, which lies north of Lake Superior, 80 percent of the forest remains for use by industry even though a severe budworm epidemic may have virtually wiped out the mature stands of the susceptible species. In the eastern part of Canada, where balsam fir and white spruce constitute a larger proportion of the total stand, the results of an epidemic may be more serious.

Union of Soviet Socialist Republics

• Ability to predict the approach of conditions under which fires may start is an important factor in the defense of forests. Investigations in the Soviet Union have shown that the degree of inflammability of a forest depends on three factors: (1) temperature in degrees centigrade during the preceding 13 hours; (2) moisture deficiency in millibars during these 13 hours; and (3) the number of days elapsed since the last rain, counting the last day of rain as the first day in the sequence. The amount of precipitation apparently has little effect on the inflammability of the vegetation on the ground, where most fires start. This can be explained by the character of such vegetation. Lichens, mosses, and also leaf litter can absorb moisture during a rain in excess of their dry weight, but they lose this moisture content a day or two after the rain and are then in the same state of inflammability as before. Shrubs and grasses obtain moisture only from the ground, and therefore the water content of their leaves and stems is little affected by rainfall. The circumstance most favorable to the spread of fires is the presence of a ground cover that dries out quickly after rainfall.

Administrative units are regularly informed of fire-hazard conditions. Short-term forecasts are made for two or three days ahead; long-range forecasts for a month ahead and for the entire season.

United States of America

• The helicopter has been used effectively in two out of the thousand fires handled in California by the Forest Service during the first seven and a half months of 1949 (up to 15 August). On one fire, fire leaders were landed in a natural opening, thus speeding control, and men were later taxied out to various other points where fire suppression parties were urgently needed. On the other, the helicopter was refueled in the air by a small plane and was able to bring supplies to fire fighters on the ground wherever these were needed. Both fires were in difficult and inaccessible terrain.

Conversion

India

• The Japanese inventor of the Bambania Process has arrived in India to supervise the manufacture of bamboo sheets for panels, ceilings, and mosaics. The process involves boiling and subjecting the bamboo to pressure during conversion.

United Kingdom

• As a result of the Economic Cooperation Administration program, a technician from Great Britain's Department of Scientific and Industrial Research will spend three months in the United States and Canada gathering information on improved methods of seasoning wood. In requesting this study, the British Government pointed out that the United States has made great strides in timber-seasoning research and practices. Because of the shortage of timber in Great Britain, the avoidance of waste—possible through the use of improved methods of seasoning—is essential. British technicians have followed U.S. developments through exchanges of information, but there has been no firsthand contact between the United Kingdom organization primarily responsible for research and advice on timber seasoning and their American colleagues for 22 years.

Utilization

India

• A bridge constructed almost entirely of wood, including the use of bent round poles as trusses, has been opened over the Rishabhavati River. It has a 10-ton load capacity and a span of more than 60 feet (18 m.). The total cost of its construction was about half that of a cement and steel bridge of similar length and capacity.

Economics and Statistics

Burma

• The trend towards nationalization of timber extraction operations and milling in Burma appears to have been reversed. It has been officially announced that the country will be opened to large-scale foreign investments to develop natural resources, including teak extraction. Conditions will be attached to safeguard national Burmese interests but also to assure investors security for their capital and a reasonable return on it.

Canada

• Canadian newsprint production is expected to total 5.2 million short tons (4.7 million metric tons) in 1949, an increase of 4 percent over Canadian-Newfoundland production in 1948. Total shipments during the first seven months of 1949 were 5.5 percent greater than in 1948. The United States took 84 percent, overseas markets 9 percent, and Canadian customers 7 percent. In 1945, 75 percent of total shipments went to the United States and 19 percent to overseas countries. The drop in exports to overseas countries has been due almost entirely to the world-wide dollar problem. Many former customers—Australia, New Zealand, Argentina, Brazil, and India—have been investigating the possibility of producing their own newsprint, and Canada has found itself more and more dependent upon the U.S. market. Consumption

in the United States has risen by about 1.6 million short tons (1.5 million metric tons) since 1945. In 1948 it was 5.1 million short tons (4.6 million m. tons); in 1949 it is expected to total 5.4 million short tons (4.9 million m. tons). Canada supplied 79 percent of the 1948 total, and is expected to supply approximately the same percentage in 1949. In 1939 Canada supplied only 64 percent of the newsprint available for consumption in the United States. Newsprint is Canada's foremost U.S. dollar earner. In 1947, newsprint exports to the United States were valued at Can$292 million; in 1948, at Can$340 million; and in 1949 they are expected to exceed Can$400 million.

Ceylon

• Consulting engineers have completed detailed plans for the establishment of a modern paper mill in Ceylon, with an estimated annual capacity of 3,000 tons, to be in operation in 1951. According to 1948/49 budgetary allocations the Government plywood factory is being reorganized so that by the end of 1949 its annual capacity will be 400,000 tea chests.

Finland

• The agreement covering Finnish deliveries to the Soviet Union during the sixth year of war reparations, ending 31 December 1950, provides among other items for the delivery of two plywood mills and two prefabricated house factories, one paper industry combine comprising a mechanical pulp mill with an annual capacity of 50,000 tons, and a board mill with an annual capacity of 58,000 tons. In addition, two paper machines and a parchment paper machine will be delivered under the same agreement.

Hungary

• In 1946 Hungary imported wood to the value of 25 million forints;[1] in 1949 it is estimated that its imports will amount to 400 million forints. To meet the growing demand for wood, efforts are being made to increase home supplies. First, long-term projects for afforesting large sandy areas, that have been discussed for the last 150 years, are being given serious attention. Second, immediate measures are being taken to increase the productivity of existing forest resources. Hungarian foresters believe that timber supplies from their own forests could be increased 50 percent by lowering the cost of forest work and increasing productivity through mechanization. During the first two years of the three year plan (1947-1950) some 6.4 million forints were set aside for improving the transportation facilities in the forests, and 2.7 million forints have already been expended for mechanizing forest operations. It is hoped that the introduction of modern transportation, tractors, cranes, and special transport facilities will bring about a 20 percent reduction in production costs.

[1] 1 forint = $.0846.

Israel

• Under a trade agreement signed between Finland and Israel for 1949/50, exports to Israel are to include newsprint, 800 metric tons; paperboard, 1,950 metric tons; paper bags, 1,750,000 units; fiberboard, 500 metric tons; prefabricated houses, $680,000; plywood, 900 m³; lumber, 1,000 standards; boxboards, 1,250 standards; and wood and metal finishing machinery, $80,000.

Kenya and Tanganyika

• A British company has started operations in Kenya and Tanganyika to obtain supplies of sawn timber and veneer butts for the production of pencil slats. The preliminary survey carried out shows that the substantial supplies of cedar in East Africa appear to be somewhat scattered and inaccessible. In the mountains, at from 6,000 to 11,000 feet (1,800 to 3,400 m.), between Abyssinia and Tanganyika, scattered forests occur. The volume per acre can be high, and the trees are sometimes big, running to over 12 feet (3.7 m.) in girth at breast height. With such a wide variation in the range, the texture of the wood is not uniform. The trees are logged and milled on the spot into "slats." A slat is about 7¼ x 2¼ x ¼ inches (18.4 x 6.4 x 0.6 cm.), and the mill produces thousands of gross of these each month. Every one is cut on the true quarter, and milling to thickness has to be exact to 0.1 millimeter. Drying also has to be exact and controlled to avoid warping, which may cause a loss of 20 percent or more. The demand for cedar is considerable, and with the shortage of dollars it is falling increasingly on East African cedar. The United Kingdom takes 50 percent of the production, and its pencil industry is a small one.

Portugal

• Plans have been drawn up by a Portuguese private group for an integrated mill to manufacture, at the start, 20,000 metric tons of sulphite pulp (10,000 tons bleached) and 18,000 tons of paper annually. As designed, the mill will permit doubling the pulp capacity, while maintaining the same ratio of bleached pulp to total pulp, and increasing the paper capacity to 28,000 tons annually, with a minimum of expense. If the plans are carried out, the mill (in conjunction with a sulphite-pulp mill now producing 6,000 tons of pulp annually) will ultimately supply Portugal's entire requirements for kraft paper and bag paper and most of its requirements for fine paper, and will still have from 30 to 50 percent of its pulp capacity left to supply the export market. The promoters of the company believe that markets can be developed in Europe for this amount of wood pulp. In 1948, Portuguese exports of pulp reached 2,420 tons, of which 500 tons went to Belgium-Luxembourg, 650 tons to France, and 1,270 tons to the United Kingdom.

Turkey

• A first shipment of Canadian pitprops, loaded in New Brunswick, has been made to Zonguldak, the principal coal port of Turkey. This was the first occasion on which a Canadian ship, with a full Canadian cargo, was discharged at a port on the Black Sea. The shipment of 2,002 piled cords (6,800 m³) was part of an order for nearly 12,000 cords (41,000 m³) of pitprops, placed in the Maritime provinces of Canada by the Eti Bank, a Government-owned company responsible for the operation of coal mines in Turkey. The balance of the order is expected to be delivered during 1949.

United Kingdom

• It is reported that, under a recent agreement, France will ship to Britain around 200,000 tons of timber for railway sleepers, wagon bottoms, packing cases, and pitprops. This would double the normal volume of wood imported by the United Kingdom from France. The agreement is regarded as a means of helping France dispose of the standing timber killed in the extensive fires in the Landes area in August 1949.

Union of Soviet Socialist Republics

• The Soviet Union hopes to obtain complete self-sufficiency in naval stores by tapping its vast reserves of Scots pine. In earlier days most of the turpentine products were imported from France. When the tapping of Scots pine began in Russia, the first operations were haphazard, not co-ordinated with the activities of the timber industry, and often controlled by different agencies. The Ministry of Forestry has co-ordinated turpentine operations with general forest exploitation, and the industry is now developing at a rapid pace. The pine reserves suitable for turpentining are unevenly distributed. Operations for the next ten years could extend in the north to 15.5 percent of the area of reserves; in the northwest to 16.9; in the central region to 12.2; in the Volga region to 0.7; in the Ural to 11.2; in western Siberia to 10.0; in eastern Siberia to 28.5; in the Far East to 0.6; in the south to 0.9; and in the west to 3.5. This means that 60 percent of the turpentine operations would be located in the European part of the U.S.S.R. and about 40 percent in the Asiatic part, chiefly in eastern Siberia.

Policy, Legislation, and Administration

British West Indies

• It has been possible during the last few years, through the Development and Welfare Fund for the British West Indies, to attack forest questions in the Windward and Leeward Islands and Barbados. The operation is supervised by the Conservator of Forests for Trinidad and Tobago, while the actual work is carried out by an Assistant Conservator of Forests detailed from the Trinidad Department. There is now a Forestry Section in the Agricultural Department, Windward Islands, and an Assistant Conservator of Forests is stationed for one year at a time in each of the islands. Forest supervisors are receiving training

at the Trinidad Department. A number of reports have been published containing geological, topographical, and forestry information from the Leeward and Windward Islands gathered during preliminary visits.

CEYLON

• In Ceylon no clearing of crown land above an elevation of 5,000 feet (1,500 meters) is allowed for any purpose whatsoever. This prohibition has been enforced from as far back as 1874. Shifting cultivation is largely confined to flat land. It is the main occupation, besides the growing of rice, of the resident population in the dry lowlands. The clearing of crown forests for this system of agriculture is allowed only on permits issued by the Government, on the basis of one acre (0.4 ha.) per family for planting food crops and another acre if required for growing cotton. The land is burned and cleared during the July-September period, and dry grains, pulses, and chillies are planted during the northeast monsoon rains in October and November. After harvesting, the land is tilled with hand hoes and sown again, this time with sesame for the brief southwest monsoon period. A third crop may finally be taken for the following monsoon season, again with dry grains and pulses, after which the land is abandoned because of increasing weed growth. The Government attempts to wean the people away from this practice by (1) colonization on land plots served by major irrigation works, (2) development of village irrigation works, (3) introduction of dry-farming arable crops in rotation under a system of alternate husbandry with pasture and fodder, and (4) co-operative reforestation of cleared areas with teak and hamilla (*Berrya cordifolia*). To induce the cultivators to stay on the land as long as possible, they are given financial assistance in proportion to the stocking achieved, and are permitted to grow plantains on the clearings or *chenas* (Burma-*taungya;* India-*Kumori;* Indochina-*rai*).

CZECHOSLOVAKIA

• To facilitate the maintenance of a proper balance between the requirements of the wood-using industries and the sound exploitation of the country's forests, Czechoslovakia has created a new central organization known as "Drevona." Its chief function is to act as a marketing agent for unfinished and semi-finished forest products such as logs, ties, flooring, poles, wooden constructions, plywood, etc., to all industries using wood, thus assuring systematic control of timber utilization.

ECUADOR

• In January 1949 an Institute of Forest Conservation and Development was set up in Ecuador under the Ministry of Economy and Agriculture to ensure the protection and development of forest resources. Its work falls into three main divisions, as follows: (1) inventory, classification, and research on forest resources; (2) afforestation, reforestation, and forest exploitation; (3) forest legislation and protection. The first division is responsible for inventories of forests and woodlands, forest type maps showing distribution of commercial species, research laboratories for wood technology and forest pathology, public education through publications (bulletins, leaflets, etc.), radio programs, a herbarium and a museum of natural resources. Its staff includes a dendrologist, a botanist, a museum assistant, a draftsman, a field assistant, and secretarial personnel. The second division is responsible for the planting of native and foreign species to determine their adaptability to different climatic and soil conditions; execution of a five-year reforestation plan based on free distribution of 5 million plants of 50 different species; development of soil conservation practices by means of forest plantations; regulation of forest exploitation to reduce waste; enforcement of fire protection and control; control of domestic and export trade in lumber and forest products; control of establishment of new agricultural areas within forested regions; and development of forest industries. It is headed by a chief agronomist-forester and staffed by 17 professional agronomists and 50 forest guards and rangers. The third division, formed by the Executive Council of the Institute, is in charge of forest legislation and protection; it has outlined a program which includes the compilation of forest laws, by-laws, and regulations; protection of wildlife; granting of lands and forests to individuals and companies for industrial development; granting of long-term credits at low interest rates through development banking institutions; and the sale at cost of machinery, equipment, tools, plants, seeds, etc. to forest planters and industrialists in lumber and forest products. This Division is headed by the President of the Institute. Its membership comprises a legal adviser and representatives of the Ecuadorian Institute of Natural Sciences, the National Irrigation Board, the National Council of Economy, the National Development Bank, and the Chamber of Agriculture.

Meetings

• A resolution passed by the national directors of the Canadian Forestry Association at a special meeting held in September 1949 urges the calling of a Canadian Forestry Congress in 1950. Spokesmen for several provinces pledged their support of the proposal, and copies of the Association's pamphlet *The Case for Forestry in Canada*, which was made public at the meeting, have been placed in the hands of the Prime Minister and all provincial premiers. The pamphlet draws attention to the outstanding fact that the forest will more than support itself economically on an increasingly profitable basis if the steps recommended are taken without further delay.

• The Thirteenth Annual Constitutional Convention of the International Woodworkers of America, assembled in Vancouver, Canada, in October 1949, reaffirmed its faith in the principles of the forestry resolutions adopted by the Twelfth Convention. These resolutions outlined "a comprehensive forestry program which, if implemented by necessary and effectively administered legislation, would result in a perpetually adequate supply of firstclass timber and contribute immeasurably to the conservation of many of our natural resources such as land and water supply."

Personalities

• The Chief of the Forestry Branch of FAO's Division of Forestry and Forest Products, Mr. Stuart Bevier Show, retired from active duty with the Division on 30 September 1949. Although he has left Washington and returned to his home in Palo Alto, California, he will continue to act as a consultant and will carry on other part-time work for the Division.

Mr. Show has the Bachelor of Science degree from Leland Stanford University, and the Master of Forestry degree from Yale. For 36 years he served continuously in various posts in the U. S. Forest Service. He became Regional Forester in California in 1926 and occupied that position for twenty years.

During his three years of service with FAO, Mr. Show's wide experience as an administrator was of great value to the Organization as a whole, and his knowledge of technical forestry and of the history and development of forestry in the United States were of exceptional value to the Division's work. It is a matter of satisfaction that his services will still be available as a consultant.

• Mr. F. Merveilleux du Vignaux succeeds Mr. Bernard Dufay as Director-General of Waters and Forests of France. He has until now been Inspector-General of Waters and Forests.

• Mr. C. S. Purkayastha, until recently Development Officer (Timber) in the Ministry of Industry and Supply of the Government of India, joined the staff of the Forestry and Forest Products Division at Washington in September 1949.

Mr. Purkayastha was an honor student in mathematics at Calcutta University and subsequently studied forestry at the Forest Research Institute at Dehra Dun. He obtained the Indian Forest Service diploma in 1927. Most of his working life has been spent in the Province of Assam, where his various posts included those of Silviculturist and Working Plans Officer. During the past two years he has had headquarters at New Delhi.

• U. Kyi, Principal Forest Officer for the Shan States, Burma, has been awarded a U.N. Economic Affairs Fellowship for a six-month period of training in the United States. He hopes to concentrate his studies on the combined use of agricultural, forest, and mineral resources and the relations of such land use with river basin development, soil conservation, and flood control.

• Mr. J. Banerjee of the Indian Waterways, Irrigation and Navigation Commission, a delegate at the Mysore Conference, is to lead a party of Indian scientists on the third Himalaya Expedition for selecting a suitable site for a high-altitude multipurpose research station. The proposed station will be the highest in the world for the study of biological sciences, physiology, glaciology, seismology, astronomy, and cosmic rays.

International Forestry and Timber Association

(Association Internationale de la Forêt et du Bois)

There has hitherto existed no international association which could embrace all forestry and timber specialists in its membership.

The need for such an association has long been felt in many countries by foresters and wood users who wished to establish closer contacts amongst themselves and promote their mutual interests.

Mr. Bernard Dufay, Honorary Director-General of Waters and Forests of France, who was for more than three years head of the French Forest Administration, has taken the initiative in founding an International Forestry and Timber Association (Association Internationale de la Forêt et du Bois), with headquarters provisionally in Paris. Mr. Dufay, president of the Association, is well known to FAO as Vice-Chairman of the Standing Advisory Committee on Forestry and Forest Products. For two years, he was Chairman of the FAO European Forestry and Forest Products Commission, as well as of the Timber Committee of the United Nations Economic Commission for Europe.

The aims of the Association are (Article 2 of the Statutes)

—to draw together, despite political and economic frontiers, all those individuals, groups, administrations, services and public institutes, which are interested in exchanging ideas, information and scientific knowledge in the domain of forestry and the utilization of forest products;

—to establish and foster friendly relations among all its members, irrespective of nationality, race, religion, and professional or doctrinal training;

—to enable its members to share ideas, to profit from each other's experiences and to broaden their knowledge, in a spirit of understanding and mutual respect;

—to lend the support of foresters and wood users to governments and international governmental organizations in their efforts to raise standards of living and to establish peaceful relations between nations.

The Association is divided into six international sections:

1) Silviculture
2) Logging and Sawmilling
3) Industries
4) Timber Trade
5) Scientific Research and Education
6) Technical Publications

Should the members in a given country so desire, the Association will bring them together into a national group which elects its own chairman with a seat on the Executive Committee of the Association.

The Executive Committee, which directs the Association, is composed of the Chairmen of the international sections and the Chairmen of the national groups. The Executive Committee elects, every three years, the President of the Association, and each of the six international sections elects a Chairman every second year.

The French National Group has already been set up and has designated as its Chairman, Mr. René Chaplain, Honorary Director-General of Waters and Forests, who, before the war, presided over the International Association of the Comité International du Bois. The Secretary-General is Mr. E. V. Letzgus, Director of the *Revue Internationale du Bois*.

Any professional in any country of the world, who is interested in the forest and the utilization of its products, may become an individual member of the Association in the international section of his choice; the individual annual subscription is 2,000 French francs or $6.00.

Collective admissions, by groups, and affiliations are also provided for.

The central office of the *Association Internationale de la Forêt et du Bois* is located at 97 rue St. Lazare, Paris, France, and full information about the Association may be obtained from this address.

Reviews

Rainfall and Runoff. Edgar E. Foster. Pp. 487, illus. MacMillan Co., New York. 1948. $9.00.

Hydrology. C. O. Wisler and E. F. Brater. Pp. 419, illus. John Wiley and Sons, New York; Chapman and Hall, London. 1949. $6.00.

The science of hydrology is relatively new, and these two books are among the first to present reasonably complete pictures of it. Such reference texts, bringing hydrology up to date, will without doubt be welcomed. Empirical and theoretical formulae continue to be developed to express storm characteristics, snow melt, runoff, infiltration, ground water storage, floods, yields, stream behavior, etc. in mathematical form. New methods for measurements are being evolved and old ones retested.

Hydrology deals with long term records of precipitation, runoff, flood frequency, etc., simply as observed phenomena. Some attention is given to effects of topography, broad soil types, climatic types, and other relatively fixed determinants.

The urgency and the very great cost of developing watersheds for flood control, irrigation, hydroelectric power, domestic water supplies, and navigation give point to the need for the greatest possible knowledge of hydrology, particularly since it is well known that major blunders have occurred in planning and designing developments due to lack of hydrologic knowledge and to grossly inaccurate assumptions used as a basis for engineering design. The large safety factors used by engineers in design of structures indicate the margin of ignorance which, despite many formulae, still exists in the growing science. Much of this is inevitable, since continuous, comparable, long-term records are still incomplete and the designer, to be safe, must assume a design flood against which presumably his structure must hold at some future date.

Foresters and agriculturists who deal with watershed or cropland management and improvement will find that hydrology, as these two books expound it, deals too exclusively with engineering aspects and overlooks or fails to recognize that vegetation is, in many areas, a major determinant of the intensity, quantity, and quality of streamflow and of the condition of underground waters. The expanding volume of experimental evidence on these points may be put in the generalized form that control and manipulation of vegetation on watersheds (i.e., control of land use) is often the single variable element that can modify up or down the calculated or assumed hydrologic forming or engineering design. Certainly the evidence is convincing that in many places the effect of good or bad condition of vegetation is or can be very great.

Clearly, the hydrologist, the forester, the soil conservationist, and the design engineer are all concerned with the efficient and economical development and use of water—that is, the public interest—and it would seem implicit that each should have a reasonably close speaking acquaintance with the others.

Perhaps one barrier to communication between the land and the water experts is that the former have not yet generally reduced their findings to mathematical

formulae and that the latter are not yet ready to concede that true and valid facts exist outside the precise language of mathematics.

A still-existing tendency to overgeneralize on vegetation as a determinant may cast a shadow of doubt over its role, even when that is fully documented in particular situations. Perhaps there is doubt that condition of vegetation can be guaranteed through stable and effective land management. Perhaps there is undue professional self-sufficiency. Whatever the reasons for the lack in working relations, it would seem important to devise means for bringing hydrology and land management together more fully in a combined operation. What, for example, will the hydrology of particular streams be if present destructive land use practices are permitted to continue? Or, conversely, what if abused and damaged lands are restored to health? Since the findings of hydrology are basic to the design of the great and costly engineering structures which are at present relied on for control of water, can hydrology continue to overlook the one great controllable variant — vegetation? In so doing it may, for example, ignore accelerated erosion induced by bad condition of vegetation, and thus overlook the inevitable rapid destruction of reservoir capacity through siltation.

Joint consideration of the whole problem of water management is a challenge to foresters as it is to hydrologists. To be most useful in this practical business, research in forest influences needs for one thing to improve the mathematical expression of its findings. Is it clearly impossible to weigh the effect of changes in cover conditions over a term of years in the hydrologic behavior of streams during the same period?

Foresters who deal with land management and betterment may well study these books, if only to learn how little their findings are at present accepted by hydrologists.

Holztechnologisches Handbuch. (Handbook of Wood Technology.) Leopold Vorreiter. Pp. 547, illus. Georg Fromme & Co., Vienna. 1949.

The demand for the industrial use of wood in all forms is growing. Therefore a book — the first of three volumes — that brings together all the available information on wood technology is very timely, especially a publication of such comprehensive character, prepared with thoroughness and meticulous regard for details, with many drawings and tables. The scope of the book may be judged by the topics it covers: the anatomic structure of wood and its external features; the physical and chemical properties of wood; protection of wood against climate, insects, fungi, etc.; strengthening and improving the quality of wood by various treatments. To make the book more usable, it is accompanied by many formulae most commonly used in wood technology, definitions of terms, conversions of volume and weight units of one country into those of another, volume tables, and statistical tables on the extent of forests in different countries. All this gives the book a somewhat encyclopaedic character and increases its value as a standard publication on the subject of wood technology.

Sawmilling Policy in Relation to Timber Produced by the State. A. J. O'Connor. Journal of the South African Forestry Association, No. 17. February 1949. 7s. 6d.

The article reviewed here discusses the present controversy in South Africa over the question whether the Government or private industry should undertake the sawing of logs produced by State plantations.

The State plantations now cover about 300,000 acres (120,000 ha.) and will be greatly extended. Though generally immature, they are already yielding 15 million cubic feet (425,000 m^3 (r)) of logs, and are eventually planned to yield 180 million cubic feet (5,100,000 m^3 (r)) per year. In addition, private plantations already cover nearly 100,000 acres (40,000 ha.), and large-scale expansion is expected. The decision as to how the large sawmilling business that will ultimately develop is to be organized, the author emphasizes, is crucial to the interests involved in afforestation, both State and private, for all time. Until the war opened opportunities for profit, the private sawmiller who did not own forests was little interested in this question, but the organized industry now takes the view that "it is the business and duty of the Forest Department to grow trees" and that "the processing of trees should be left to private enterprise."

Three possible ways to organize the utilization of logs produced by the State have been examined by the Board of Trade and Industries and are analyzed by the author:

(1) Sawmilling entirely by private enterprise.

(2) Sawmilling by an organization under some form of State control.

(3) Sawmilling partly by private enterprise and partly by an organization controlled by the State.

As to the first, the view of the Board of Trade and Industries is quoted as follows: "There exists a real danger, should the State withdraw from sawmilling, that one or two powerful groups may in time completely dominate the industry. It is to the interests of both the consumer and the grower, whether State or private, that such a development should under all circumstances be prevented." The claim that State sawmilling is inherently less efficient than private sawmilling is regarded as unproved.

As regards the second alternative, State sawmilling, the author first examines the main objections raised. These, in summary, are:

"(1) *Some of the most efficient private mills would have to disappear.* The proposal does not aim at the compulsory disappearance of any efficient plant, or even at compulsory change in ownership. On the contrary the proposal makes allowance for the continued operation of existing private mills on their present basis if a case for their retention can be sustained.

"(2) *Private mills which are allowed to continue their participation in the business of processing logs produced by the State 'would generally find themselves in an unfavorable position as against the State factories. These as a rule would obtain better, more regular and larger saw-log supplies and perhaps continue to enjoy other privileges.'* Why the conditions feared by the Board of Trade and Industries should arise, or can arise, is not clear unless one assumes that the Forestry Commission would be biased against the private mills. Private mills which for good reasons are allowed to participate in the business would become customers of the Commission. It is absurd to suppose that the Commission would then deliberately hamper its customers and thus adversely affect the prices they can pay for logs. The assumption that the Commission, which would have control of say 90 percent of the log output, would be so petty as to weigh the balance against those who have control of 10 percent is, to say the least of it, unwarranted. In any case, contracts would be arranged with private millers covering specific quantities and specific plantation areas, and the price of logs would be adjusted according to conditions. There would be no question of the Commission encroaching on the areas under contract. Further, the Commission need not be allowed special privileges.

"(3) *The private planter might easily find himself in an unenviable position, because he would have to sell either to private mills in a worse position than the State factories or to the State monopoly.* This argument is a very strange one, in that it completely overlooks the objects, functions, and constitution of the Forestry Commission. The functions of the Commission would be laid down by Parliament and they would include the specific duty of protecting the interests of the private grower. If the Commission then cannot or will not protect the interests of the private grower, who else will do so, or how else can it be done?

"(4) *Complaints and friction would in such circumstances probably be intensified. Sooner or later, too, conflicts with the Timber Trade and with the pulp and paper industry would most probably arise.* One would suppose that under a Forestry Commission the exact opposite would be the case. Internal controversy in the forest industry would be eliminated or minimized because the parties thereto would be eliminated or minimized. It is not at all clear why conflict should arise with the timber trade unless the latter refuses to handle South African timber, which they may do, Forestry Commission or no Forestry Commission. The reference to the paper and pulp industry is even more obscure. The by-products of the forest industry would be available for the pulp industry just as sawn timber would be available for other industries. The by-products would be plantation and sawmill waste, and in this case there would be no conflicting interests concerned with importations of the product.

"(5) *A State-controlled trust would in time develop into a large and unwieldy monopolistic undertaking with all the economic disadvantages of such struc-*

tures whether State owned or not. Here the Board of Trade and Industries brings in the argument of 'diseconomies of size.' It should be noted that 'size' here cannot refer to sawmilling plants themselves. No plant properly located so as to minimize transport of logs will be large enough to bring in the factor of diseconomies of size. The term can then apply only in the technical and managerial spheres. We shall see in due time how this difficulty, which is supposed to be so important an objection to the establishment of a Forestry Commission, can be overcome in the Board's own solution of the problem. In the meantime one can ask: if it is a vital objection in this case, is it not equally so against an undertaking like the South African Railways? Does it not apply even to State afforestation? The establishment, protection, management, and exploitation of State plantations is surely just as big an undertaking as the utilization of the logs produced. There is such a thing as decentralized regional control, which in fact applies to the Railways and the Forestry Department and as regards sawmilling it could be applied in the most effective manner under the Forestry Commission scheme.

"Generally, after analyzing the objections advanced against the Forestry Commission project, it is difficult to avoid the conclusion that they are forced and artificial. In any case, if the proposal is to be rejected on the strength of the objections such as they are, then it must be shown that there is another alternative which will avoid the objections without sacrifice of advantages. We must now examine the alternative recommended by the Board of Trade and Industries to see how far it will go in that direction."

The Board of Trade proposal is for alternative No. 3, with the following important differences as compared to the present systems:

"(1) Sawmilling by the Forestry Department is to give place to sawmilling by a share company controlled by the State.

"(2) The company is to enjoy no special privileges and is to compete for saw log supplies on equal terms with private enterprise; BUT

"(3) The disposal of saw logs is to be left entirely to the discretion of the Forestry Department, and it is to be clearly understood that the Department is to support the State-controlled company in all cases where conditions of harmful monopoly threaten to develop.

"(4) The policy of the State-controlled company is to be laid down by the Minister of Economic Development in order to remove as far as possible the suspicion that the Forestry Department may be prejudiced in favor of the company, and (apparently for the same reason) no person connected with the Forestry Department is to be appointed to represent the State on the company's board of directors. The Board should consist of business men and men acquainted with the problems of the industry."

The author regards the proposal as one that bristles with difficulties of conflict and controversy and that would deprive the Forestry Department of all standing in the sawmilling business.

He considers the solution of the problem to lie in sawmilling by the State as represented by a Forestry Commission. Advantages foreseen include better returns to the State from afforestation; protection of the interests of the private plantation owner; elimination of danger of harmful monopoly; greater ability of the forest industry to meet overseas competition; better regional organization; more effective arrangements for research and for co-ordination of production and sales; minimizing of conflict and controversy. Existing middlemen sawmillers could be dealt with equitably.

Bosbouwkundige Studiën over Suriname. (Forestry in Surinam.) J. W. Gonggryp and Dr. D. Burger. Pp. 262, illus. H. Veenman & Zonen, Wageningen, Netherlands. 1948.

This is a comprehensive analysis — written in Dutch with English summaries — of all aspects of the forestry problem in Surinam. Part I deals with the forests themselves, forest soils, and different vegetation types. The study of types is detailed and of great interest. It is linked up with the Beard classification and includes classifications by climax formations and formations induced by fire and human agencies. The ecological, silvicultural, and technological features of twelve of the principal forest species in Surinam are reviewed.

Part II considers the real potentiality of the forest: the volume of standing timber, the annual cut, etc. It also stresses the importance of an adequate wood supply for the local fishing industry. A section is devoted to secondary forest products and the importance of edible and industrial fats and oils, tanning products, balata, etc., in the overall economy. The principal causes of damage and destruction to the forests by shifting cultivation, fire, and insects, are dealt with in some detail. The section on forest management outlines the work that has been accomplished in the development of better methods of utilization and transportation of forest products, and suggests that control of timber exports should be exercised by the Forest Service. Great importance is attached to the provision of adequate shipping facilities so that timber may be exported to the Netherlands rather than exclusively to North America.

The book ends by pointing out ways to improve the living conditions of forest workers, and emphasizing the need for expansion of research work in co-operation with established research stations in other countries. A revision of the present legislative and financial systems would be of value to the forestry program. There is an extensive bibliography, and the book has excellent illustrations.

Farm Forestry in India. A. P. F. Hamilton, C.I.E., O.B.E., M.C., I.F.S. *The Indian Forester,* XLVII, 3, March 1948.

Mr. A. P. F. Hamilton has been the link of transition from the old Indian Forest Service to the new one with its all-Indian cadres. Having successfully carried out this delicate job, he is particularly fitted to summarize the general lines of policy that the experience of the old forest service bequeathes to the new. It will rest with the new forest service either to continue along these lines or to modify them as conditions may change in the new order of things. As a summation at this turning point, Mr. Hamilton's article will be of interest to our readers and is therefore discussed at some length.

It is well-known that in India the proper and necessary role of forests and forestry is an important one, and that it has by no means been achieved. Forest policy as early as 1894 recognized that there should be sufficient forests for the well-being of the country and for the prime task of preserving the climatic and physical conditions of the country. But under population pressures, uncontrolled expansion of agriculture has resulted in an ill-balanced rural economy, with its attendant evils of erosion, reduced soil moisture, and shortage of fuel, timber, and grazing.

In this thoughtful article the retired Inspector-General of Forests examines the steps which are needed to bring the assistance of forestry to agriculture, to apply the original sound policy principles to the whole countryside — in short, to bring forestry to the farm, since the urgent requirements of the rural community can be met only to a limited degree by State forests. Forestry must be linked more closely to agriculture.

The true tasks of farm forestry are great: (a) to achieve the maximum degree of self-sufficiency possible on the farm; (b) to utilize the land to the best advantage; (c) to increase the fertility of agricultural lands by preventing erosion and increasing water storage in the soil, by mitigating the desiccating effect of hot winds, by providing firewood so that the cow-dung now almost universally used as fuel can be used as fertilizer; (d) to improve the condition of cattle by introducing pasture management and stall-feeding and by providing leaf fodder to supplement the chronic fodder shortage; (e) to supplement, where possible, the farmer's income.

The difficulties of application, too, are great: an uneducated rural population, which has come to accept its situation as inevitable; varying conditions of land tenure and tenancy; excessive grazing; the need of finances to break out of the present vicious circle, even though the long-run results may be clearly beneficial.

Government must lead in integrating farm forestry with general planning for the countryside, and this involves more effective co-ordination among several departments. A new department or board, with experts from all present departments is needed. Meanwhile, some progress, but by no means enough, is being made. It is imperative to have an extension service to provide free training in the elements of forestry and soil conservation to the people who till the soil.

In general, farm forestry is being planned along the following lines:

(i) The proper management of privately owned forest under working plans will be enforced by legislation.

(ii) The owners of large agricultural estates will be encouraged to retain a small area, say 5 percent of the land, under tree crops and to afforest waste land; Government may be vested with residual powers of compulsion.

(iii) Where there is a well-organized village community, the common land, or neighboring crown waste, if there is any, will be managed as village forest by co-operative societies or village committees under working schemes.

(iv) Farm forestry will be closely integrated with major or minor soil-conservation and land-development plans; and the opportunity for laying the foundations of a well-balanced economy from the start will be seized wherever large-scale colonization schemes are undertaken.

(v) In the intensively cultivated tracts with small, often fragmentary holdings, farm forestry in the real sense is not possible. These areas are, however, critically short of forest produce. The peasants will be encouraged to grow deep-rooted and valuable trees such as *Acacia arabica* on field boundaries, around wells, etc., and on small areas of uncultivable land. Starting with two or three trees per acre, the cultivator, when he realizes the advantages, will himself work out the optimum number that he can grow around his fields. The consolidation of holdings has greatly assisted farm forestry.

(vi) Hot drying winds, particularly those which blow at the end of the winter, and monsoon rains when the grain is beginning to swell seriously reduce crop yields. Shelter belts on the American and Russian scale may be impracticable in India, but Government must be responsible for what primary system is possible, and this will mainly take shape along canals and roadsides and on the margins of rivers For the rest, the measures described above will do much to provide a system of interrupted shelter belts. Research, undertaken jointly by the Agriculture and Forestry Departments, to establish the most suitable species and technique for shelter belts and windbreaks is important.

(vii) Grazing and fodder requirements are given prominence in land planning.

(viii) Farm forestry will be made to pay where possible. The production of many valuable minor forest products, such as tanning stuffs, fibers, lac, gums, grasses, can be developed, and local industries will be encouraged.

(ix) Financial assistance is often necessary; policy varies, but loans on easy terms are made to larger farmers and landlords; subsidies are given to impecunious cultivators on certain conditions.

(x) An organization for publicity and education is essential.

(xi) The basis of land planning must be a survey of a region, conveniently a civil district, which will provide a blueprint of economic development. A survey might indicate the necessity for establishing State firewood reserves to prevent the denudation of the countryside by the demands of some local consuming center or industry.

Finally, legislation will be needed to protect private and community forests and to compel a recalcitrant minority to obey the principle of the greatest good to the greatest number. The State will need to lead for a long time, until self-help is accepted and put in practice by landlord and farmer.

If faithfully carried out, a cohesive program such as this can hardly fail to aid rural India in providing its multitudes with greater and more permanent supplies of food, clothing, and shelter.

The Estimation of Fire Hazard in Great Britain. T. R. Peace. *Forestry* (the Journal of the Society of Foresters of Great Britain), XXII, 2, 1948. Pp. 16. 7s. 6d.

This report summarizes a four-year trial in the Forest of Dean of a method of calculating fire danger based closely on the work of Wright and Beall in Canada. A method devised by the Meteorological Office was also tested, but gave results too erratic for practical use. The Wright-Beall system can be used, and will give in one locality a reasonably smooth curve, agreeing reasonably well with experienced foresters' estimates of hazard and with the actual occurrence of fires. Both these estimating bases are described.

Because of the great variability of the English climate, measurements must be applied to a limited area around the station where they were calculated. It is worthy of note that over the whole trial period the Danger Index never exceeded a numerical rating of 12; thus conditions of extreme hazard (often called explosive) as provided in the Canadian system by values 13-16 were never experienced. This, the author concludes, is in accord with the facts, since far longer periods of low humidity occur in North America than in England. This is an interesting example of applying a technique developed in one country to the problem of another.

The Forests of Present-Day Finland. Yrjö Ilvessalo. Pp. 56. Helsinki. 1949. (Metsätieteellisen Tutkimuslaitoksen Julkaisuja. Communicationes Instituti Forestalis Fenniae. 35.6).

Finland's forest resources have been investigated twice, the first national forest survey having been made in the years 1921-24 and the second in 1936-38. Since the latter survey, considerable changes have taken place in the extent and condition of the forests; the peace treaty, which provided for the cession of 4,347,800 hectares to the Soviet Union, has also altered the picture of the country's forest resources. As no exact data on the forests of postwar Finland will be available before the third national forest survey is carried out, probably in 1951-1953, Professor Ilvessalo has made the necessary recalculations and readjustments in order to bring the earlier statements into concordance with the actual facts. His account is based on the findings of those surveys which were made according to a combination of the line survey and circular sample plot methods. Some of the interesting statements, especially those pertaining to postwar changes, are mentioned below.

The system of natural watercourses which, with about 40,000 kilometers of maintained floating channels, has proved most valuable for the Finnish forest economy, was partially cut by the new east frontier, which isolated the biggest water system area from the Gulf of Finland. For this reason, timber transportation has been more dependent on truck and railway transports than previously.

A forest area of 3.18 million hectares (equal to 12.8 percent of the country's total prewar forest area) was ceded to the Soviet Union in the peace treaty. As a result, the new calculations show that Finland, which was previously the second largest forest-owning country in Europe, now ranks third, after the Soviet Union and Sweden. The total forest land of the country comprises actually 21.66 million hectares, which corresponds to 71 percent of the whole land area. 17.08 million hectares are classed as productive forest land and 4.58 million hectares as poorly productive forest land. It is emphasized that a considerable part of the latter class could be transferred into the first class by draining swamps — it has been estimated that about 4 million hectares of the swamps, which cover an area of 10.1 million hectares, are drainable for forest growth — and that part of the land now belonging to the category of waste land, totaling 5 million hectares, could also be converted into productive forest land by drainage.

As a comparison it may be mentioned that, according to national surveys made about 1930 in Sweden and Norway, the forest percentages in these countries were 56 and 23 respectively. Also the average forest area per inhabitant in Finland is considerably higher (5.1 ha.) than in Sweden (3.6 ha.) and Norway (2.5 ha.).

The Finnish forests are comparatively poor with regard to species of trees. They are dominated by coniferous trees, pine (*Pinus silvestris*) covering 53 percent and spruce (*Picea excelsa*) 28 percent of the forest area. 16.8 percent is covered by birch (*Betula alba*), and the remainder by species of less commercial value, such as aspen, gray and black alder, and, to some extent, oak, basswood, elm, ash, maple, etc.

An interesting feature in the development during the 15-year period between the first and second surveys is the 13-percent increase in the spruce-dominated forests at the cost of pine, gray alder, and clear areas. One of the main reasons for this change has been preoccupation with sufficient spruce supply for the rapidly expanding paper industry of the country.

With regard to age conditions it is pointed out that the forests of northern Finland require nearly twice as much time as the forests of southern Finland to reach the same size of exploitability. Therefore, in the southern parts of the

country, forests are chiefly middle-aged or approaching the felling age; in the northern half, close to 70 percent of the forests have reached the age of about one hundred years. Estimates on the mean volume, including bark — i.e., the volume of growing stock on an average per hectare — show for the forests of the whole country a figure of 63.2 cubic meters per hectare. Converted so as to be comparable, this figure (58.4) is lower than the corresponding figure obtained in Sweden (59.1), but higher than that in Norway (41.4) in the first Swedish and Norwegian national forest surveys. Professor Ilvessalo points out that "in general, the mean volume of the Finnish forests is much lower than it could be if the forests were fully stocked and properly taken care of."

The total growing stock of the Finnish forests has decreased from 1,588 million cubic meters in 1922 to 1,560 million in 1938 and 1,370 million (corresponding to 1,149 million m^3 excluding bark) at present. The loss caused by war thus represents a figure of 190 million cubic meters. The growing stock of the Swedish forests, according to the survey completed about 1930, is greater (1,417 million m^3), but that of Norway is considerably smaller (320 million m^3). Because of the sparsity of population in Finland, the growing stock per inhabitant (305 m^3, excluding bark) is still higher here than in Sweden (232 m^3), Norway (113 m^3), or any other European country.

In the Finnish survey, a diameter of 20 centimeters (about 8 in.) at breast height has been adopted as the limit between small trees and large (timber) trees, and according to this classification 60.5 percent of the growing stock consists of small trees and 39.5 percent of large (timber) trees. The apparent trend has been a decrease in the growing stock of large timber and an increase in the growing stock of small trees. As a result of this development, expansion of the sawmill industry, which depends upon the supply of large timber, has ceased; the pulp and paper industries, on the contrary, are expanding.

Computed in comparable terms, the mean annual growth is 1.99 cubic meters in Sweden, 1.95 in Finland, and 1.35 in Norway. The total annual growth of the Finnish forests is 40.8 million cubic meters, without bark, which is 4.9 million cubic meters less than that of the forests before the peace treaty. Corresponding Swedish and Norwegian figures are 46.7 million and 9.9 million cubic meters respectively. In Finland it has been noticed that the proportion of pine in the annual growth is considerably greater than that of spruce or other species of trees.

As the Finnish survey methods have been developed to give as many-sided results as possible, the data collected give a picture also of the development of the treatment of forests. A comparison between the results of the two surveys shows an improvement in this respect from about 1912-21 to about 1927-36. Cuttings of the nature of selection had decreased considerably and thinnings had become more general. On the whole, however, Professor Ilvessalo states, the silvicultural condition of the Finnish forests leaves much room for improvement. According to the classification categories applied in the second survey, only 14.4 percent of the whole country's forests can be classed as forests with "good" silvicultural conditions; 50.8 percent would be classed as "satisfactory," 30.8 as "unsatisfactory," and the remainder as spoiled or devastated forests.

In connection with the survey, an estimate was also obtained of the future felling quantity of the Finnish forests, called the silvicultural felling quantity. The quantity arrived at for the two 10-year periods following the survey was an annual average for present-day Finland of 31 million cubic meters and, in the event that trees dried out on the stump are cut everywhere, of 34 million cubic meters. According to Professor Ilvessalo, this may be considered the minimum sustained felling quantity. When trees that decay on the growing site, mostly in remote regions, are added to this felling quantity, an annual average of 34-36 million cubic meters as a calculated "normal" removal is obtained. The actual removal of wood from the Finnish forests, the annual growth, and the "normal" removal of wood are given in the following growth balance (stem wood, green, excluding bark), in millions of cubic meters:

Average of the years	*Removal*	*Growth*	*"Normal removal"*
1923-1938	41	46	38
1935-1939	42	46	38
1940-1944	33	46	38
1945-1948	[1]48	41	34–36

[1]Figure is uncertain.

As to the postwar figures, it must be remembered that the cession of large forest areas has reduced the growth figure and that reconstruction, resettlement of the population evacuated from the ceded territories, war reparation deliveries, shortage of coal, and the rapid rise in exports have increased the removal of wood far above the "normal" removal.

Cessation of exports and shortage of imported fuel during the war were reflected in greater utilization of wood, and the increased use of firewood as fuel for industry was still evident during the years immediately after the war. The utilization of wood (stem wood, green, excluding bark) for different purposes is shown in the table below, in percent.

PERCENTAGE UTILIZATION OF WOOD

	1923-38	*1938*	*1940-44*	*1946*
Raw material for industry	44.4	47.8	25.4	31.4
Firewood for industry	3.1	3.2	9.1	9.1
Household use by rural population	34.2	30.7	37.7	32.9
Exports of unmanufactured wood	8.4	7.7	2.8	4.2
Means of communication	3.6	3.7	10.2	9.3
Other purposes	6.3	6.9	14.8	13.1

Since 1948, the uses of wood have been regaining their prewar proportions, owing especially to increased imports of coal.

A breakdown of the industrial uses of wood confirms the fact that, since the 1930's, sawmilling, which is the oldest and largest form of woodworking industry in Finland, has not expanded and obviously has reached the limit of its raw material supplies. On the other hand, the wood pulp and paper industry has been considerably enlarged, and other industries also, such as plywood manufacturing and the comparatively young industries producing prefabricated wooden houses and their components, the fiber and rayon industries, etc., have been increasing their respective shares in the utilization of wood. In 1946 the distribution in raw materials use was as follows: sawmilling, 52 percent; pulp and paper industry, 41.8 percent; plywood manufacturing, 5 percent; and other forest industries, 1.2 percent.

Professor Ilvessalo has come to the conclusion that, owing to the loss to the Soviet Union of a considerable part of the forest resources and a great number of woodworking enterprises,[1] the woodworking industry of Finland cannot be expected to reach its prewar level for some time.

The booklet reviewed here contains data also on the ownership of the forests in Finland. The postwar development shows an increase in private forest ownership, especially in the form of small holdings. This tendency is mainly due to the fact that the State forests were more heavily affected by the cession of territory under the peace treaty than other forests, and that the resettlement of the evacuated population has reduced large holdings of other ownership classes by purchase or requisition. At the beginning of 1948 the ownership of forests was divided as follows: private 57.3 percent; State 34.2 percent; companies 6.8 percent; communities 1.1 percent; church 0.6 percent.

Professor Ilvessalo's booklet also includes summary information on forest administration and forestry organization, forestry legislation, and forestry research work in present-day Finland.

Forestry and Water Supplies in South Africa. C. L. Wicht, Dr.-Ing., F.R.S. Union of South Africa Department of Forestry Bulletin, No. 33. Pp. 58. 1949. 6d.

The statement has frequently been made, largely by laymen, that afforestation, particularly of exotic species, has

[1]In an article dealing with the effects of the war on the supply of wood raw material for Finnish forest industries (published in the Economic Review of Kansallis-Osake-Pankki, No. 1, Helsinki, November, 1948), Professor Eino Saari numerates the factories lost and their annual production as follows: 77 sawmills (200,000 standards), 4 plywood factories (45,000 m^3), 7 cellulose mills (290,000 tons), 7 wood pulp and cardboard factories (65,000 tons wood pulp and 2[illegible],000 tons cardboard), 4 papermills (37,000 tons), 1 spool and bobbin factory (700,000 gross spools and bobbins) and a new rayon factory.

had a desiccating effect on water supplies in South Africa. This report undertakes to place the problem in its proper perspective. It examines the hydrology of the South African forest regions, the evidence regarding modification of the water cycle through land management, and the specific evidence of effects of forests on water supplies in South Africa. In some cases the drying-up of springs and streams after planting is to be explained by concurrent substantial decreases in precipitation, and the revival of waterflow after cutting by concurrent increases in precipitation.

The evidence is far from complete and is sometimes contradictory, but after analyzing it and studying pertinent material from other countries, the author arrives at the following conclusions, subject to results of detailed work under way:

1. Plantations of exotic trees, grown to timber size, will probably not use more water than the indigenous forests, if they are on comparable sites.
2. Plantations of exotics and indigenous forests will probably use more water than fynbos (sclerophyll scrub) or grass communities. The magnitudes of the differences are not known, but in the case of plantations they will probably be greater the more conditions deviate from those in true, moist, high-forest regions.
3. The consumption of water by plantations, forests, and other plant communities will depend chiefly on the amount of water available in the soil.
3. The consumption of water by plantalogical order, that is, occupying similar positions in the succession of vegetation, will probably use approximately equal volumes of water.
5. Swamps and vleis tend to dry up if trees are planted in them, and also if the natural succession progresses as far as the forest climax. The water is constantly available or accessible to the roots of the trees because it is stagnant or nearly so.
6. There is no evidence that fast-growing tree species use more water than slow-growing ones, all other factors being equal.
7. The removal of vegetation, natural or artificial, from catchments, especially along stream banks, will cause an increased discharge from the streams. The advantage is probably temporary because it depends on the retention of deep soils, rich in humus, which is impossible without a good cover of vegetation.
8. Heavy, ground-cover provided by plantations and forests retards floods and builds up and conserves soils.

Where tree planting is contemplated, therefore, the following recommendations should be considered:

1. Extensive afforestation should not be undertaken unless there is a reasonable chance of making a good profit on the money invested, or unless there is some convincing local reason demanding the establishment of trees—for example, hut-pole growing in native territories to reduce exploitation of natural forests; aesthetic reasons; firewood production on farms; or provision of shelter for stock.
2. As far as possible afforestation should be restricted to forest regions with high rainfall. There are many areas in South Africa where extensive afforestation should not be encouraged.
3. From the point of view of water conservation, long rotation timber crops should be preferred to short rotation, quick-profit crops such as eucalypt coppice for mine props, or wattle for tanning bark. In making this statement, the important economic role of such crops is not lost sight of. Sites for these crops should, however, be selected with care.
4. Where the discharge of streams is used for irrigation or for industrial or municipal purposes, moist areas along streams should not be planted up. This has been the Forestry Department policy since 1932.
5. Tree-planting is not forestry. Sound silvicultural practice and management on a sustained-yield basis are essential; if these are not introduced, the effects may be harmful on even the most suitable sites.

The Charles Lathrop Pack Demonstration Forest, Warrensburg, N. Y. Results of Twenty Years of Intensive Forest Management. Clifford H. Foster and Burt P. Kirkland. Pp. 36, illus. The Charles Lathrop Pack Forestry Foundation, Washington, D. C., U.S.A. 1949.

In 1927 the late Charles Lathrop Pack purchased a partly wooded property of 2,200 acres (880 ha.) near Warrensburg in New York State, in the heart of the natural white pine (*Pinus strobus*) region. Desiring that this property should be used to demonstrate the possibilities of scientific and economic forestry, he placed it under the management of the New York State College of Forestry at Syracuse. The results of careful management during the ensuing years are now reported in the booklet reviewed here.

At the time of acquisition much of the forest had been heavily cut over, but there were considerable areas of relatively satisfactory pure stands of white pine. Natural reproduction of pine had occurred, for the most part on areas which had formerly been cleared for agriculture; in those parts of the property which had always been under forest cover, broadleaved species predominated and very little pine reproduction was to be found. Development work was commenced in 1927. A small nursery was established and seedlings for the forest plantations were obtained from Syracuse. During the following winter the forest was mapped and subdivided into permanently marked compartments. Timber volumes and the condition of growing stock were determined for each compartment by means of randomly located circular sample plots a quarter acre (0.1 ha.) in area. Growth estimates were made from increment borings through the use of Schneider's formula.

Determination of the annual cut was made by means of sample markings in each compartment, and all the relevant information was compiled into a working plan in 1930. Some 80 acres (19 ha.) of the property were set aside as an "ecological reserve" in which no logging or other disturbance has since been permitted.

The objects of management were to plant up open fields, to keep annual fellings well below estimated annual growth in order to build up growing stock, to cut over the whole forest area at frequent intervals in order to minimize losses due to mortality, and to favor the development of trees likely to yield timber of the highest quality.

The susceptibility of white pine to damage by blister rust (*Cronartium ribicola*) presented a special problem in forest protection. This has been dealt with successfully through eradication of the alternate hosts of the blister rust (*Ribes* spp.).

A small permanent sawmill was built in the forest, and an additional light truck-mounted mill has been developed which can be set up to saw very small quantities of logs wherever desired.

The forest is open to the public for hunting, fishing, and other recreational activities and, in accordance with the wishes of its founder, it has been extensively used for purposes of public education.

In 1947 about 1,307 acres (529 ha.) were classified as bearing merchantable trees, the remainder of the area being occupied by plantations, young broadleaved stands, administrative sites, etc. During the 18 years, 1930-47, the total cut amounted to nearly 1.1 million cubic feet (31,000 m^3), and during the same period the volume of standing trees suitable for saw timber increased by just over 45 percent. Thus, an actual yield of close to 3 cubic meters per hectare has been obtained from the portion of the forest actually under operation, and at the same time great progress has been made towards building up growing stock. The results obtained are thought to be of great significance to forest operators in the region.

Wood Specimens. Pp. 206. 100 reproductions in color. Published by the trade journal, *Wood*, London. 1949. £2 2s.

Each week the trade journal *Wood* (United Kingdom) contains a facsimile in natural color of a commercial wood. A selection of a hundred of these has now been published in one book, forming a most attractive and useful reference work for all who are seriously concerned with timbers. The reproductions featured include almost all the common woods, most of the well-known decorative woods, and a number of so-called "new" woods. Notes on habitat, growth, working qualities, and uses accompany each specimen, together with illustrations of the tree and its leaf. Botanical, trade, and local names are cross-indexed. An introduction gives an outline of world timbers, and a world map helps to fill in the picture of world timber supplies. Color reproductions may be misleading, for the color of timbers is apt to be extremely variable. The specimens, however, do help to produce a proper appreciation of texture, grain, and other growth characteristics needed for the identification of commercial woods.

Tecnologia de la Maderas. (Wood Technology.) Juan Jose Galante. Imprenta y Casa editoria *Coni*, 684 Calle Peru, Buenos Aires. 1946.

Although three years old, this book is worth mentioning as a well-documented, complete, and practical Spanish-language work on wood technology in the broadest sense of the term. The author has tried to adapt it to the conditions of Argentina and to the properties of native or imported woods most commonly used industrially. He discusses successively construction woods which he has investigated, Argentine woods, and imported woods. Lumbering and wood utilization, considered especially from the theoretical standpoint and from the standpoint of woodworking and industrial problems, constitute the major portion of the book.

Maderas de Venezuela. (Venezuelan Woods.) Harry Corothie. Imprimeria Nacional. Caracas, Venezuela. 1948.

This work is intended to facilitate the identification of the more common Venezuelan woods with the help of their macroscopic properties. The first section lists groups of macroscopic properties which can serve to identify the various woods and defines each of these properties. The botanical families included in each group of identifying characteristics are listed, and a numbering system is used to group the features of each family and of each main species in order to identify them. The author further points out those characteristics which appear frequently but not constantly. The last section of the book groups species according to the possible utilization of their wood; their common names are listed in alphabetical order and correlated with their scientific names. Use was made of the collections of the National Herbarium and the work of Government botanists. The work, intended as a textbook, is to be warmly welcomed as a further addition to Spanish-language technical literature in this field.

Report of the Forest Department for the Years 1945-1947. Colony and Protectorate of Kenya. Pp. 57. 1949. 5s.

This report, although belated, records not only the operations of the period, but the development of main features of a comprehensive forest policy lately published by the Government as a result of studies by a subcommittee of the Development Committee. Fortunately, due to the vision and determination of Sir David Hutchins, Conservator of Forests 1908-11, the main forest areas were reserved long since.

Significant features of policy include the following: (1) Forests are a national asset and must be maintained for improvement of the country and benefit of the people. This requires that a high proportion be maintained and managed by Government and that a suitable long-range forest policy be framed, unaffected by political change and backed by stable finance. (2) Reservation must cover all useful or potentially useful forests, including protection forests. (3) All forests must be brought under scientific management with detailed and comprehensive working plans. (4) All means must be employed to encourage forestry everywhere. (5) All forests must be brought to a full stage of production both for domestic needs and for export.

An estimate of domestic needs for saw timber for 30 years has been made, and a planting program to supply these demands is proposed, as well as a staffing program and budgets for both investment and operation. The Development Report has raised the importance of forestry to a far higher level than before; trebling the proposed expenditure. It recognizes the forests as a great and productive asset, capable of playing a major part in economic development.

As to actual operations, progress has been made in many ways. Fire protection, roads, buildings, and mechanical transport have been increased, the staff has been greatly expanded, training has been increased, and field-work districts and divisions have been set up. A detailed re-examination of all boundaries has been begun, and a program for examination and reservation of all forests which ought to be reserved has been undertaken under criteria set up by the Forest Boundary Commission. An East African Agriculture and Forest Research Organization has been planned, which should benefit all concerned. Forest research has heretofore received too little attention. Decision to convert railway engines to burn oil will make it possible to divert quantities of eucalyptus to other uses. Economic use of the natural highland forests is beginning. Heretofore they have been managed for protective values only. Much remains to be learned about correct silviculture. Positive steps are planned to integrate forestry in Kenya more closely with that in neighboring territories. The report depicts an aggressive and forward-looking program.

Die Forstbenutzung. (Forest Utilization.) Karl Gayer and Ludwig Fabricus. Pp. 733. Verlag Paul Parey, Berlin. 1949.

This well-known German textbook has now appeared in a fourteenth edition. The authors state that only the most necessary revisions were made, since bringing the book completely up to date would have taken a number of years. In view of the shortage of textbooks for forestry courses, it was therefore thought best to bring it out as soon as possible without major changes.

Einführung in die Forstliche Zuwachs- u. Ertragslehre. (Introduction to the Study of Forest Growth and Yield.) Karl Vanselow. Pp. 156, illus. Third improved edition. 1948. J. D. Sauerländer, Frankfurt am Main, Germany. DM 8.80.

The subject of forest growth and yield has thus far been taught as part of the general subject of either forest mensuration or forest management. Yet growth and yield, in the opinion of the author, are so fundamental to the entire practice of forestry as to deserve special study and consideration more commensurate with their importance. The entire book, therefore, is devoted to a review and analysis of the actual growth and yield of individual trees and of entire stands. These growth figures were not arrived at mathematically but were obtained from measurements of a large number of sample plots taken by the forest experiment stations. They cover pure and mixed forests of beech, spruce, pine, and oak of seedling origin (high forest) and forests of coppice origin. Attention is given to the increased growth due to thinnings and admission of light into the forest. There is a chapter on the potential yields from an "ideal" so-called normal forest. A comprehensive bibliography is appended. The book brings together valuable information hitherto scattered in various forest periodicals and points up the problems that need further investigation.

Grundbegriffe aus Forstlicher Messkunde mit Besonderer Berucksichtigung des Feldmessens. (Fundamentals of Forest Mensuration. With special reference to forest surveying.) Hans Hufnagel and Hans Puzyr. Pp. 197, illus. Georg Fromme & Co., Vienna, Austria. 1949. $1.50.

This pocket-size volume is intended exclusively as an aid for foresters in their field work. One of its three brief chapters deals with the measurement of felled timber, standing trees, and volumes of whole stands. Another discusses the different methods of land surveys — by geodesy, levelling instruments, and demarcation of forest boundaries. The last chapter is devoted to the detailed analysis of field measurements, the checking of errors, and the preparation of working plans and forest maps. The presentation is simple and direct, and only the essentials which every forester must know in his practical work in the woods are treated. The booklet is one of a series of similar publications now in preparation, dealing with fundamentals of silviculture, fundamentals of forest utilization, forest protection, etc.

Lumber, Plywood, and Allied Products Industry Report. Quarterly with annual statistical supplement, U. S. Dept. of Commerce, Office of Domestic Commerce. Pp. 40. Government Printing Office, Washington, D. C., September 1949. $1.00.

The U. S. Department of Commerce has increased the size and scope of its Lumber Industry Report, renamed the quarterly publication, and added a new annual statistical supplement. The goal of the new publication is to co-ordinate and simplify the mass of information on production, stocks, and trade collected by governmental and trade organizations. An effect of presenting the information in one place is that all segments of these industries will increasingly recognize their common interest. The former publication has always been very useful to its readers, and the new enlarged edition appears to be even more valuable.

FAO wishes to acknowledge the friendly co-operation of the editors of the following publications received by FAO on an exchange basis with UNASYLVA *and the* Yearbook of Forest Products Statistics.

ALGERIA
- Le chêne-liège

AUSTRALIA
- Australian Timber Journal
- Forest Products News Letter
- Organic Farming Digest

AUSTRIA
- Allgemeine Forst- und Holzwirtschaftliche Zeitung
- Garten-Zeitschrift Illustrierte Flora
- Internationaler Holzmarkt
- Osterreichische Papier-Zeitung
- Tyroler Bauern Zeitung

BELGIUM
- Agricultura
- Bulletin de l'Association pour la Défense de l'Ourthe et de ses Affluents
- Bulletin agricole du Congo belge
- Bulletin du Comptoir de Vente des Bois Congolais
- L'Echo des bois
- Bulletin de la Société Centrale Forestière de Belgique
- Communications (Séries A, B, C), Travaux (Séries A, B, C) — Station de Recherches de Groenendael

CANADA
- British Columbia Lumberman
- Canadian Nature
- Conservation
- Forest and Outdoors
- Forestry Chronicle
- Forêt et Conservation
- Prairie Lumberman
- Publications — Association des Ingénieurs Forestiers de la Province de Québec
- Pulp and Paper Magazine of Canada
- Revue canadienne de Biologie
- Timber of Canada
- Woodlands Review
- Woodlands Section Index

CHINA
- China Weekly Review

COLOMBIA
- Revista—Facultad Nacional de Agronomía
- Vida Rural

CYPRUS
- Forest Treasures—The Journal of the Cyprus Forestry Association

CZECHOSLOVAKIA
- Drevarske Hospodarstvi
- Interagra—Journal of the Institute for International Collaboration in Agriculture & Forestry
- Lesnicka Prace
- Polana

DENMARK
- Dansk Skovforenings Tidsskrift
- Forstlig Budstikke
- Hedeselskabets Tidsskrift
- Tidsskrift for Planteavl

DOMINICAN REPUBLIC
- Agricultura

FINLAND
- Finnish Paper and Timber Journal
- Finnish Trade Review
- Skogsbruket

FRANCE
- L'Action forestière et piscicole
- Arbre
- Le Bois
- Bois et forêts des tropiques
- Bois et résineux
- Bois et scieries
- Le bois national
- Bulletin de la Société Forestière de Franche-Comté et des Provinces de l'Est
- Bulletin de l'A.T.I.P.
- Bulletin de la Société Nationale d'Acclimatation et de la Protection de la Nature
- Bulletin officiel de la Fédération des Associations de communes forestières françaises
- Les Cahiers des Ingénieurs Agronomes
- Economie et Humanisme
- La Papeterie
- Revue du bois
- La Revue forestière française
- Revue internationale du bois
- Urbanisme

GERMANY
- Allgemeine Forst- und Jagdzeitung
- Forst und Holz
- Forstwissenschaftliches Centralblatt
- Holzforschung
- Natur und Volk
- Das Papier
- Weltholzwirtschaft
- Zeitschrift für Weltforstwirtschaft

GREECE
- Publications—Ministry of Agriculture

HUNGARY
- Erdeszeti Lapok

INDIA
- Indian Forest Bulletins; Indian Forest Leaflets; Indian Forest Records — Forest Research Institute and Colleges
- Indian Print and Paper
- Indian Pulp and Paper

INDONESIA
- Archief voor de Rubbercultuur
- Korte Mededeeling van het Boschbouwproefstation
- Tectona

ITALY
- Bollettino di Statistica Agraria e Forestale
- L'Industria della Carta
- Italia Forestale e Montana
- Review of the Economic Conditions in Italy

MALAY STATES
- Malayan Forester

MEXICO
- El Mensajero Forestal

NETHERLANDS
- De Houthandel
- International Building and Wood Workers Survey (Newsletter)
- Statistische en Econometrische Onderzoekingen; Maandstatistiek van de In-Uit-en Doorvoer Jaarcijfers voor Nederland
- Tidschrift over Plantenziekten Mededelingen Landbowhogeschool

NORWAY
- Meddelelser fra Vestlandets Forstlige Forsksstasjon
- Skog-og Landarbeideren
- Skogbrukeren
- Skogeieren
- Tidsskrift for Skogbruk

POLAND
- Las Polski

PORTUGAL
- Agros (Boletin da Associacao Estudantes de Agronomia)
- Boletin da Junta Nacional da Cortica
- Boletin Mensal do Instituto Nacional de Estatistica
- Centro Estudes Economicos
- Pinhal e Resina

PUERTO RICO
- The Caribbean Forester

ROMANIA
- Bulletin de l'Institut National de Recherches Technologiques de Roumanie

SOUTHERN RHODESIA
- Rhodesia Agricultural Journal

SPAIN
- Montes—Ingenieros de Montes

SWEDEN
- Afarsvarlden
- Norrlands Skogsvardsforbunds Tidsskrift
- Svensk Papperstidning
- Svenska Skogsvardsforeningen
- Svensk Travarutidning
- Svenska Traforskninginstitutet
- Travaruindustrien

SWITZERLAND
- Geobotanisches Forschungs-Institut Rubel in Zurich
- Holz
- Der Praktische Forstwirt fur Die Schweiz Administration
- Schreiner Zeitung
- Schweizer Naturschutz
- Schweizerische Zeitschrift für Forstwesen

UNION OF SOUTH AFRICA
- Journal of the South African Forestry Association; also Scientific Bulletin
- South African Timber Trades Journal

UNITED KINGDOM
- Arbor
- British Plastics
- Building Science Abstracts
- Empire Forestry Review
- Endeavour
- The Field
- The Paper Container
- Paper Maker
- Paper Making and Paper Selling
- Quarterly Journal of Forestry—Royal English Forestry Society
- Review of Applied Mycology
- Rothamsted Experimental Station Report
- Scottish Forestry
- Sylva
- Technical Bulletin—Technical Section, Paper Makers' Association of Great Britain & Ireland
- Timber and Plywood

(*Continued on back cover.*)

FAO Member Nations

Afghanistan
Australia
Austria
Belgium
Bolivia
Brazil
Burma
Canada
Ceylon
Chile
China
Colombia
Costa Rica
Cuba
Czechoslovakia
Denmark
Dominican Republic
Ecuador
Egypt
El Salvador
Ethiopia
Finland
France
Greece
Guatemala
Haiti
Honduras
Hungary
Iceland
India
Indonesia
Iraq
Ireland
Israel
Italy
Korea
Lebanon
Liberia
Luxembourg
Mexico
Netherlands
New Zealand
Nicaragua
Norway
Pakistan
Panama
Paraguay
Peru
Philippine Republic
Poland
Portugal
Saudi Arabia
Sweden
Switzerland
Syria
Thailand
Turkey
Union of South Africa
United Kingdom
United States of America
Uruguay
Venezuela
Yugoslavia

(List of exchange publications continued from inside back cover.)

United Kingdom (*cont.*)

Timber News and Sawmill Chronicle
Timber Trades Journal
Trees—Journal of the Men of the Trees
Wood—Forestry, Marketing, Application
World's Paper Trade Review

United States of America

Alabama Conservation
American Box Maker
American Forests
Arborist's News
Barrels, Boxes, Packages
Bulletin of Duke University—School of Forestry
Bulletin—Institute of Paper Chemistry
Bulletin—Yale University—School of Forestry
California Forester
Castanea
The Chemical Bulletin
Connecticut Woodlands
Contributions—Boyce Thompson Institute
The Cross Tie Bulletin
Crow's Pacific Coast Lumber Digest
DuPont Magazine
Facts for Industry
Farm and Home Research

United States of America (*cont.*)

Fibre Containers
Fire Control Notes
Forest and Park News
Forest Club Quarterly
Forest Farmer
Forest Leaves
Forest Research Notes
Forestry Bulletin of the Tennessee Valley
Forestry Digest
Furniture Manufacturer
Industrial Bulletin
Interchemical Review
International Woodworker
Journal of Franklin Institute
Journal of Forestry
Journal of Soil and Water Conservation
The Laboratory
Living Wilderness
The Lumber Merchant
Mississippi Valley Lumberman
Monsanto Magazine
Monthly Bulletin—News Print Service Bureau
Monthly Statistical Summary
Morris Arboretum Bulletin
National Hardwood Magazine
National Lumber Trade Barometer

United States of America (*cont.*)

New Technical Books
Pacific Northwest Industry
Pacific Plastics Magazine
Paint Industry Magazine
Paper Industry and Paper World
The Paper Maker
Paper Mills News
Paper Trade Journal
Pulp and Paper Industry
Rayon Organon
Research Notes
Sierra Club Bulletin
Southern Lumber Journal
Standardization
Station Notes
Timber Topics
The Timberman
Tree-Ring Bulletin
Trees
Unit
Wisconsin Conservation Bulletin
Wood Preserving News
Wood Working Digest
The Wooden Barrel

Venezuela

Publications—Ministerio de Agricultura y Cría, Dirección Forestal y de Conservación de Suelos